S. HRG. 101-122

INDOOR AIR QUALITY ACT OF 1989

HEARING

BEFORE THE

SUBCOMMITTEE ON SUPERFUND, OCEAN, AND WATER PROTECTION

OF THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

ON

S. 657

A BILL TO AUTHORIZE A NATIONAL PROGRAM TO REDUCE THE THREAT TO HUMAN HEALTH POSED BY EXPOSURE TO CONTAMINANTS IN THE AIR INDOORS

MAY 3, 1989

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INDOOR AIR QUALITY ACT OF 1989

WEDNESDAY, MAY 3, 1989

U.S. SENATE, COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS, SUBCOMMITTEE ON SUPERFUND, OCEANS, AND WATER PROTECTION,

Washington, DC.

The subcommittee met, pursuant to notice, at 10:02 a.m., in room 406, Dirksen Senate Office Building, Hon. Frank R. Lautenberg [chairman of the subcommittee] presiding.

Present: Senators Lautenberg, Durenberger, Chafee, and Mitchell.

OPENING STATEMENT OF HON. FRANK R. LAUTENBERG, U.S. SENATOR FROM THE STATE OF NEW JERSEY

Senator LAUTENBERG. The Subcommittee on Superfund, Oceans, and Water Protection will come to order.

This is the first hearing of the 101st Congress of this subcommittee. During the next year we will be addressing many of the cutting-edge issues in environmental policies—superfund implementation, the implications of the right-to-know data, coastal pollution, ground water protection. It's an important agenda.

I'm particularly pleased that Senator Dave Durenberger who is the ranking Republican member of this subcommittee is here today. He's one of the leading voices on environmental policies, and his leadership and cooperation will be of great value to this subcommittee. We've worked together on other issues, and our agenda is direct and uniform. I expect that it will be in this legislation as well.

This morning we're going to consider one of the most important issues, indoor air pollution. We'll be looking at S. 657. That's the Indoor Quality Act which Senators Mitchell, Chafee, Durenberger, and I, along with 15 other Senators, introduced earlier this year.

It's clear that we have to address indoor air quality. EPA Administrator Bill Riley has said, one, that indoor air pollution is a serious problem that's not being addressed by current programs; two, that it may be a more serious threat to human health than outdoor air pollution; and, three, that the national debate is not really yet begun about how to respond to this threat.

I want this debate to begin with today's hearing. It's clear from the comments made by the EPA Administrator that he's ready. Unfortunately, the administration apparently is not ready for this debate.

This past January EPA submitted to OMB a report on indoor air pollution required by the radon gas and Indoor Quality Research Act of 1986 which Senator Mitchell and I introduced. This report

was due to the Congress last fall, but rather than moving quickly to address the indoor air problem, OMB has chosen to sit on its report.

This is an unacceptable situation. We know that serious risks are posed by indoor air pollutants such as radon, environmental tobacco smoke, carbon monoxide, biological contaminates, and pesticides.

As far back as 1987, EPA identified indoor air pollution as an area of relatively high risk but low EPA effort. So today, in an attempt to move the debate along on indoor air pollution, I am making the EPA proposed report available to the public. OMB may be willing to bottle up the facts, but I'm not.

The proposed report contains a number of important conclusions. First, that indoor air pollution represents a major portion of the public's exposure to air pollution and may present serious health risks.

Secondly, we need to expand efforts to mitigate exposure to indoor air pollutants.

Thirdly, we need to invest in an expanded research program at roughly the levels authorized in S. 657.

Finally, the total costs of indoor air pollution including medical costs and lost productivity are in the tens of billions of dollars a year.

These findings are not surprising. Available evidence clearly demonstrates the seriousness of the problem.

Radon gas is an estimated to cause up to 20,000 cancer deaths a year. The Surgeon General has determined that environmental tobacco smoke is a cause of disease including lung cancer in nonsmokers.

Other long-term effects of the exposure to harmful levels of indoor air pollutants include respiratory illnesses, central nervous system disorders, and reproductive problems. Acute reactions to certain pollutants include headaches, throat, skin and eye irritation, fatigue, shortness of breath, and nausea.

We'll be hearing today from witnesses who have suffered from some of these effects. People spend approximately 90 percent of their time indoors. So the risk to health from indoor air pollution may be greater than from air pollution outdoors, and the people most exposed to indoor air pollution—the young, the elderly, and the chronically ill—are often the most susceptible to its adverse effects.

In addition, an estimated 15 percent of the United States population have an increased allergic sensitivity to common chemicals. One of my constituents, Mary Lamielle is literally a prisoner in her own house because of her chemical sensitivity. Mary's fighting back. She's director of the National Center for Environmental Health Strategies, a national organization dealing with this problem. I admire her courage and I am pleased that her husband Charles is here to testify on her behalf.

S. 657 builds on the prior legislation which Senator Mitchell and I introduced. I'm hopeful that Bill Riley at EPA will lead this response so that we can move positively with legislation.

I want to work with the Administrator on this debate on how to address indoor air pollution. I look forward to hearing the testimony of our witnesses.

I call on my distinguished colleague, Senator Durenberger, for his opening statement.

OPENING STATEMENT OF HON. DAVE DURENBERGER, U.S. SENATOR FROM THE STATE OF MINNESOTA

Senator DURENBERGER. Mr. Chairman, it's a pleasure to be here at the first hearing of the new Subcommittee on Superfund, Oceans, and Water Protection. I look forward to working closely with you on a whole range of issues in this Congress.

You and I have already joined on bills to control toxic air pollution, to encourage waste minimization activities by industries, and elevate the Environmental Protection Agency to cabinet status.

I know that the chairman's priorities also include careful oversight of the superfund program, legislation on coastal pollution problems, and I believe that ground water protection will also be a priority for this subcommittee. I look forward to the work of a very active subcommittee and couldn't be more pleased with the opportunity to work with you, Senator, on these many issues.

On the subject of today's hearing, I would like to make just two points before we hear from the witnesses. First, the administration has not yet had the opportunity to develop an indoor air quality policy and a position with respect to this particular legislation. The hearing comes a bit early for them.

We appreciate very much the testimony they have submitted, but it would be helpful to have the administration's specific views on the bill before moving it along, if that's possible.

We can't wait forever, of course, but I do hope that we can press them for an early resolution of their policy process, and then after getting their views, move this bill.

The second point, I'd like to say that there's one aspect of the bill which has always troubled me and that I hope we can address it this time through. This bill is, I would say, a typical pollution control bill in that it asks EPA to list a series of substances and then set health-based standards for those substances. The standards are incorporated in health advisories under the bill.

That approach does not always work well in our environmental laws. In fact, it has usually failed to produce the results that Congress has expected.

We can all name a string of failures—section 112 of the Clean Air Act, the Safe Drinking Water Act, the water quality standards under the Clean Water Act, and so on.

For a few of the major indoor air pollutants—and I think you've named some of them—radon, asbestos, tobacco smoke—the pollutant-by-pollutant approach might make sense, but when you get beyond this handful of substances the approach usually breaks down because it's too resource-intensive.

Indoor air pollution is in some respects different from ambient outdoor pollution. Most important I think is the fact that the indoor environment can be controlled. Buildings are systems. Air quality is already under control in buildings. Heating and ventilation are a fundamental aspect of building ownership and operation.

I don't think this bill recognizes that difference between indoor air pollution and other forms of pollution which we encounter in

other legislation. The bill leans too much on controlling the individual pollutants and not enough on the potential to manage the total living environment.

This bill needs to be informed by the science of building management as well as the science of chemical toxicology. I hope we can learn more about both those subjects and remedy that oversight that's here, Mr. Chairman.

I would also like to say that the Finance Committee is holding an important hearing this morning and I'm going to have to spend a little time down there.

Also, Senator Chafee, who was here earlier, had to go to the Finance Committee hearing, but he asked me to have his statement placed in the record.

Just let me conclude by saying I'm interested in this subject. I come from a State that's one of the first to be interested in it. I look forward to working with you and the other members of the committee on the bill.

Senator LAUTENBERG. I thank you, Senator Durenberger. We'll see that Senator Chafee's statement does go in the record.

[Senator Chafee's statement follows:]

OPENING STATEMENT OF HON. JOHN H. CHAFEE, U.S. SENATOR FROM THE STATE OF RHODE ISLAND

Mr. Chairman, Thank you for scheduling this hearing on the serious health risks posed by indoor air pollution. This is the first hearing of the superfund, ocean and water protection subcommittee, and I am very pleased that you have chosen to focus on a problem which potentially effects millions of Americans in their workplace and their homes.

Under your leadership, and that provided by Senator Durenberger, the ranking member of this subcommittee, I am confident we will see reasoned, well-crafted legislation emerge as a result of your efforts.

Last year Senators Mitchell and I, with the support of Senators Lautenberg, Durenberger and others, authored the "Indoor Air Quality Act". This bill establishes a national program to reduce the threat to health posed by indoor air pollution.

It is estimated that the average person spends up to 90 percent or more of his time indoors. Yet, until recently, almost no attention was paid to the quality of the indoor air environment. Major environmental contaminants such as radon and asbestos have brought the indoor air problem to the public's attention. Last year this committee authored and passed a major bill, signed into law by the president, to address the problems of radon gas. Yet a wide array of other pollutants, including formaldehyde in pressed wood products, methylene chloride in paint remover, and lead, mercury and other inorganics make their way into the indoor air environment.

Because indoor pollutants are not as easily dispersed or diluted as outdoor pollutants, concentrations indoors may be much greater than those outdoors. According to an EPA study, indoor levels for some pollutants may exceed outdoor levels by up to 500 percent.

Also, it has come to my attention that a report describing the activities carried out by EPA to address indoor air pollution, congressionally mandated under Title IV of the "Superfund Amendments and Reauthorization Act of 1986", has not yet been submitted to this committee. This report was due to Congress last October, and was promised by EPA to be delivered in December. Yet here it is May, and we have not seen the report. To make matters worse, this report, in draft form, was the subject of a hearing by EPA's science advisory board, and has been disseminated to several groups.

I believe that William Reilly and the present administration are serious about environmental protection. In particular, Administrator Reilly has made strong statements on the need for an expanded effort to address indoor air problems while he was the president of the Conservation Foundation. Releasing this report to Congress could only serve to strengthen the relationship between the executive and legislative branches on the important issue of environmental protection.

Again, I want to thank the leadership of this subcommittee for scheduling this hearing. I look forward to informative and insightful testimony.

Senator LAUTENBERG. I welcome my distinguished colleague, Senator Mitchell, who is one of the prime advocates of cleaner indoor air and has written legislation to that effect in the past and also is the originator of this bill that we're considering today.

Senator Mitchell.

OPENING STATEMENT OF HON. GEORGE J. MITCHELL, U.S. SENATOR FROM THE STATE OF MAINE

Senator MITCHELL. Thank you, Mr. Chairman. I begin by commending you for holding this hearing and Senator Durenberger for his continuing interest in the subject of health threats posed by contaminants in the air indoors and to consider legislation which I've introduced to respond to this problem.

I first became concerned about indoor air quality several years ago because of a special problem in my home State of Maine. Many Maine homes and buildings have high levels of radon gas. As we now know, the radon problem is not limited to Maine or to any few States. The Environmental Protection Agency estimates that between 5,000 and 20,000 Americans die each year of lung cancer attributable to radon, and the EPA has called radon in homes and schools a major national health problem.

As we learn that the radon problem is not confined to just a few States, we also learned that radon is not the only health threatening contaminant in the air indoors. Asbestos, combustion byproducts, volatile organic chemicals, biological pollutants and tobacco smoke are known to pose significant health threats.

In hearings I chaired on the indoor air quality problem in the last Congress witnesses agreed that Americans spend up to 90 percent of the day indoors and are exposed to a wide range of contaminants in the air in work places, schools, and homes.

The EPA's own research program offers convincing documentation of the health threats posed by indoor air contaminants. A recent EPA study of total exposure to air pollutants states:

> Indoor exposures to air pollutants, indoor exposures to these toxic and carcinogenic chemicals are nearly always greater, often much greater, than outdoor concentrations.

Just last year the EPA published a major study of indoor air in public buildings and concluded that:

> Volatile organic chemicals are ubiquitous indoors. About 500 chemicals were identified in just four buildings, and new buildings had levels of some chemicals that were 100 times higher than outdoor levels.

The Indoor Air Quality Act, which I introduced with Senators Lautenberg, Chafee, Durenberger, and others in March of this year, authorizes a national program to reduce the health threats posed by contaminants in the air indoors. The bill would expand and strengthen research of indoor air contaminants and provide for the development of health advisories indicating the health risk subcontaminants.

Another section of the bill provides for a national response plan which would focus and direct the relevant authorities for control of indoor air pollution which exists in current statutes. The key objec-

tive of the bill is to demonstrate development of very basic indoor air quality management strategies and assessments at the State level. The bill would also expand the authority of the National Institute of Occupational Safety and Health to conduct assessments of so-called sick buildings.

As a final note, I urge the administration to work with us in responding to indoor air pollution. The EPA report which Senator Lautenberg earlier mentioned clearly documents the concern at the EPA for assessing and responding to this problem. Yet, administration officials outside the agency seem unwilling or unable to address this issue.

I hope this will change and that we can work cooperatively to develop the best possible legislation to protect the quality of the air indoors.

It is unacceptable for the administration not to have completed or to have made available this report seven months after the law required it to be completed and made available. It is simply no excuse that this has been a change in administration. Daily we receive requests for cooperation from the administration. Daily we are urged to believe that this administration is different from the previous administration in environmental policy. Yet, here we have a report that the law required to be completed and made available last October, and now seven months later we're still waiting to hear.

I want to stress my deep concern about that and to encourage the EPA in this and other respects to be forthcoming. I understand that the problem is not at the EPA, that it's at OMB, as most problems are in such matters, but it's all part of the same administration. We expect better cooperation in the future.

I commend Senator Lautenberg for his active leadership in this regard. That report is very important and I think will strengthen the case for action.

I thank you, Senator. I will not be able to stay for the full hearing, but I did want to come to extend my gratitude to you for holding the hearing and to emphasize my belief in the importance of this subject and the need for this legislation.

Senator LAUTENBERG. Thank you, Senator Mitchell. We know that you have a busy agenda, and the fact that you've come here this morning and expressed yourself as directly as you have lends credence to the fact that this subcommittee and this committee are going to be hard at work and we're willing, if we must, to air our differences with OMB—"air our differences", that's kind of a pun—and to make sure that this information moves us to do something about a problem that we all recognize is here.

Certainly Mr. Riley in his former life recognized that. I have a quote that came from him when he was the head of the Conservation Foundation. He said, Information that's emerged in recent years makes it clear that contamination of the indoor environment may be a much more serious problem than was realized a decade ago and must be moved much higher on a public and private research agenda.

I know that Mr. Rilley feels that way, and we hope that he can convince his colleagues in the administration to let it free up.

Senator MITCHELL. Mr. Chairman, I may have some questions that I would submit in writing to the witnesses and ask that their responses be made available at their convenience in writing.

Senator LAUTENBERG. We'll make certain that they're made aware of those questions and we will be looking for their response.

Thank you very much, Senator Mitchell, for joining us.

Now we call our first witness, Mr. Erich Bretthauer. He's the Acting Assistant Administrator for R&D at the EPA.

Because we have a full schedule this morning we will not have enough time for entire statements to be made orally, we ask you, Mr. Bretthauer, to summarize, and see if you can do it in five minutes. We won't use a guillotine if it's past five minutes, but we ask you to look at that as a serious indication that we have to get on with the hearing, and so it will be with the other witnesses. We invite you now to give your testimony.

STATEMENT OF ERICH BRETTHAUER, ACTING ASSISTANT ADMINISTRATOR FOR RESEARCH AND DEVELOPMENT, ENVIRONMENTAL PROTECTION AGENCY

Mr. BRETTHAUER. Thank you, Senator. I believe I can do it, give my abbreviated statement, in five minutes.

My name is Erich Bretthauer. I'm Acting Assistant Administrator for the Office of Research and Development at EPA.

EPA's Office of Research and Development plays an important role in carrying out the agency's research responsibilities under title IV of the Superfund Amendments and Reauthorization Act.

In previous testimony on indoor air legislation, EPA indicated that it could not endorse legislation pending completion of a comprehensive report to Congress mandated under section 403 of SARA. While the agency's work on this report is largely complete, the policy recommendations contained in the report have not been fully reviewed by the current administration.

Similarly, because the administration is still reviewing S. 657, we do not yet have a position on the bill which I can communicate to the committee at this time.

Nevertheless, I would like to briefly summarize for you the agency's indoor air activities and the progress we have made to date in implementing title IV of SARA.

By October 1986, when title IV of the superfund amendments were signed into law, a number of significant program initiatives were underway to address specific pollutants, including asbestos, radon, and pesticides. In 1986 EPA began to realize that a chemical-by-chemical approach to indoor air pollution problems was not going to be sufficient to solve all indoor air problems.

As a result, we created an indoor air staff whose functions are to develop at EPA an indoor air quality policy, disseminate information, and coordinate the indoor air activities underway at EPA with those in Federal, State, and local governments and in the private sector.

In June of 1987 EPA submitted its indoor air quality implementation plan to Congress which outlined our strategy for addressing indoor air quality problems. The first element of this strategy is to

begin, through an active research program, to characterize indoor air exposures and develop methods to reduce these exposures.

EPA's indoor air research program emphasizes four research areas: the first, source characterization and mitigation; second, monitoring; third, health effects; and, fourth, exposure assessment and risk characterization.

EPA research devoted to source characterization and mitigation includes using small test chambers to develop protocols for quantifying emissions from different building materials and studying the effectiveness of different mitigation approaches.

The research is complemented by studies in a research test house which provides real time, large-scale results which can be compared to those from chamber studies and indoor air quality modeling.

Our monitoring research includes compiling a compendium of indoor air quality measurement methods and using these methods to measure indoor pollutants in buildings. For example, EPA researchers recently reported on their measurement of indoor air quality in ten public buildings. This research confirmed that indoor air levels of many pollutants often exceed those outdoors.

Additional examples of EPA's indoor research include health effects research devoted to studying short-term health effects associated with exposures to mixtures of chemicals and exposure assessment and risk characterization research which include the preparation of indoor air quality information submitted to Congress as part of the indoor air quality implementation plan.

EPA researchers along with those from the National Institute of Occupational Safety and Health, the Department of Energy, and Yale University have recently completed the first phase of a study at the Library of Congress and EPA's headquarters facilities in an effort to uncover sources of complaints in those buildings. These studies have included developing and administering an occupant health and comfort survey and performing measurements of indoor pollutant levels and ventilation rates.

In addition, an example of EPA's non-occupational pesticide exposure study, which we call NOPES, has included measuring personal exposures to both indoor and outdoor concentrations of 32 common household pesticides.

As you can see, EPA's indoor air quality research program is a very active one and continues to provide useful information to assist EPA program offices, the States, the private sector, and the general public.

A major thrust of the Office of Air and Radiation's indoor air program is to focus on indoor air quality information dissemination. EPA recently published jointly with the Consumer Products Safety Commission a booklet for the general public entitled, "The Inside Story: A Guide to Indoor Air Quality."

We think this booklet will have substantial impact on educating consumers of both potential risks of indoor air pollution and, more importantly, practical steps individuals can take to reduce these risks.

We have also recently completed a comprehensive directory of State agency contacts on different indoor air quality issues. This directory provides the public with State government contacts who

can provide information and assistance on indoor air quality problems.

Despite the progress we are making in addressing indoor air quality problems, we recognize that more work is needed. As a result, the agency is increasing the level of effort being applied to indoor air issues. The budget for the indoor air program office is proposed to increase fourfold in our fiscal year 1990 proposal to the Congress. In addition, I anticipate increasing the level of indoor air research in EPA in fiscal year 1991.

In summary, we believe that EPA is making significant progress in development of an effective response to the growing problem of indoor air pollution and anticipate working closely with this subcommittee in the future.

Senator LAUTENBERG. Thank you very much, Mr. Bretthauer.

Your last statement I know should not be taken too literally, but you say you look forward to working with us on the indoor air problem. We couldn't tell it from watching videotape, I must tell you. Using kind of allegorical language here—we just haven't had the kinds of responses that we'd like to see.

Your full statement will be inserted in the record. Anything that you neglected to mention in your oral report will be included if it's in your written statement.

Under section 403, the Radon Gas and Indoor Air Quality Research Act of 1986, EPA was required to submit a report by October 17 last year. Why did it take so long to get that report out and why didn't it meet the deadline that was mandated to do so?

Mr. BRETTHAUER. Part of it, Senator, was in EPA itself. The complexity of coordinating the response of the report with all the other agencies caused a delay in EPA in getting the report to OMB for review. We submitted it in January of this year.

Senator LAUTENBERG. Do you have any idea when the work began on that report?

Mr. BRETTHAUER. I don't offhand, Senator. I know that the initial efforts began shortly after the legislation was passed.

Senator LAUTENBERG. You have responsibility for R&D, and I know that you don't run the Department, but two years seems like a long time to wait for something like that. We're now almost two and a half years since the legislation was enacted. To get to January and then say, well, we couldn't get the others to cooperate doesn't sound like a lot of energy was placed into the delivering of that report.

What are the plans now for the administration to release the report?

Mr. BRETTHAUER. The plans are to have discussion, at the Domestic Policy Council and originate an administration policy early this summer or by fall.

Senator LAUTENBERG. Do you believe that indoor air pollution poses a problem as serious as outdoor air pollution?

Mr. BRETTHAUER. I believe that indoor air pollution is a serious problem. I think that outdoor air pollution is also a serious problem. I hesitate to say it's more important. We have different chemicals outdoors than we do indoors, and we have ecological effects of pollutants outdoors which make comparison very difficult, but I be-

lieve that indoor air is a very serious problem. I think we have to address both it and outdoor air.

Senator LAUTENBERG. Do you think that it's tough to control some of the indoor air pollution as it might be to control outdoor air pollution?

Mr. BRETTHAUER. I think that in some cases indoor air pollution can be controlled relatively easily because of the ease of removal of sources. In other cases where the sources are included in the building itself, it may be more difficult.

Senator LAUTENBERG. Right, but you can certainly get significant reductions of polluting material indoors, some of the sprays, et cetera, that we use.

The President has made clean air legislation a priority. Yet, it doesn't seem to make sense to me that the administration has shown so little interest in indoor air quality when they've been expressing so much concern about outdoor air pollution.

How do you see my statement?

Mr. BRETTHAUER. I believe that indoor air pollution will be important on the administration's agenda. I think it's just a matter of priorities in terms of when it will be addressed.

Senator LAUTENBERG. Priorities being what?

Mr. BRETTHAUER. The major energy now is devoted to the Clean Air Act, the three separate bills in regard to the clean air proposals.

Senator LAUTENBERG. Are you aware of the administration's submission on legislation for clean air?

Mr. BRETTHAUER. No, I'm not.

Senator LAUTENBERG. In 1987 EPA issued a report saying that indoor air quality was an area of relatively high risk and low EPA effort compared to other sources of pollution. How does the current funding compare to the funding EPA suggested in the report now at EPA, if that was such a concern?

Mr. BRETTHAUER. The budget before the Congress for fiscal year 1990 proposes quadrupling the resources for the air program office. I can tell you our plans are to consider additional resources in the research program in the coming fiscal year.

Senator LAUTENBERG. The increase is some million dollars; it's for four more people. If I were just to use that as an equation, I'd say they're being paid pretty well—four people for a million bucks, but I'm sure that's not the case.

However, there's a level of interest there that looks tepid to me at best. In 1991, preliminary information says that we may be looking about at the same level.

There hasn't been honestly, Mr. Bretthauer, the kind of interest evident to me that shows that they consider this a serious problem. How does this funding compare to other areas of similarly high health risk?

Mr. BRETTHAUER. Quite frankly, Senator, I think that it's relatively low in proportion now. I think that the priority of indoor air will be increasing as we assess and prioritize our budgets in the future.

Senator LAUTENBERG. Has EPA done anything to mitigate exposure thus far to indoor air pollution?

Mr. BRETTHAUER. We have a very active research program, Senator, in which we evaluate various types of techniques to reduce hazardous exposures from indoor air pollutants.

As I indicated in my oral statement, we have test chambers where we estimate exposures from various types of sources typically found inside the home. We also have a test house in North Carolina where we try to model those exposures with actual exposures to people inside the house, so we can use modeling information from our test chamber information.

We also have an active health research program where we're looking at the health effects of certain types of indoor exposures including those of kerosene heaters.

Senator LAUTENBERG. Has there been any rule or regulation issued that would direct itself at the reduction of indoor air pollution particularly?

Mr. BRETTHAUER. No, it's the feeling of most who are involved in the indoor air problem that perhaps the best way to go is to provide a good, solid research base of understanding of the problem and provide that information to the public.

We believe that EPA's radon program is an excellent example of providing information, to the public, and then allowing them to make their choices regarding minimization of exposures.

Senator LAUTENBERG. An area I'm particularly concerned about, chemical sensitivity to indoor air pollutants, you heard in my opening remark the sad tale of a person confined virtually to home. Do you think that this is a problem that merits attention?

Mr. BRETTHAUER. I believe it's a problem that merits attention, although I would say that the medical community is divided over the seriousness of the issue. We certainly take it seriously. We're going to look at it in the context of our future research proposals, Senator.

Senator LAUTENBERG. So, thus far, EPA has not really addressed this?

Mr. BRETTHAUER. That's correct; we have not addressed it.

Senator LAUTENBERG. Does anything that you recommend now to OMB focus on the problem?

Mr. BRETTHAUER. The research program that we're advocating recommends evaluation of noncancer end points, yes, sir.

Senator LAUTENBERG. Thank you very much, Mr. Bretthauer.

Senator Durenberger?

Senator DURENBERGER. The legislation that we are considering requires EPA to publish health advisories identifying adverse health effects for a number of pollutants found in the indoor environment. Can you tell me from your knowledge whether the science has advanced enough now to also consider the combined or the synergistic effects of these chemicals; for example, the health risk from radon gas when it's combined with tobacco smoke? Do we have instruments for measuring this available?

Mr. BRETTHAUER. I believe we have the instruments for measuring them. What we don't have, Senator, is the understanding of how these mixtures combine in the body in terms of producing an overall health effect. Sometimes we believe they're additive; sometimes we believe they're synergistic—in other words, more than additive—and sometimes they're antagonistic.

We need to have a broad research area to really understand the effect of mixtures in the human body, and we're addressing that in other parts of our research program.

Senator DURENBERGER. You're doing what in other parts of your research program?

Mr. BRETTHAUER. We're attempting to understand the effects of mixtures that we all live in, the myriad of chemicals that we're exposed to each day, the combination of those and how the totality of their exposure affects us as humans.

Senator DURENBERGER. Well, if I were looking for some scientific evidence of this effect, under the current commitment we've made in this country how long would I have to wait?

Mr. BRETTHAUER. Personally I believe it's long-term—we'll be waiting a number of years before we fully understand this. Right now we have a rather simplistic approach, a chemical-by-chemical approach, and many of us feel that it will be a number of years before we can really understand how those mixtures behave when they're all integrated together.

Senator DURENBERGER. No amount of stimulation, financial or otherwise, would speed that time line up very much?

Mr. BRETTHAUER. Well, certainly resources always reduce time lines to some degree. Part of it is just basic fundamental research that's underway at EPA and other Federal agencies now to gain an understanding of how chemicals react in the body.

I'm not sure that just adding a lot of money is the answer, although it may be a part of it.

Senator DURENBERGER. EPA's draft report on indoor air quality refers to the cost of lost productivity due to indoor air pollutants. Could you explain how the agency arrived at those estimates?

Mr. BRETTHAUER. The data for that, I believe, came from the Honeywell survey which indicated a relationship to productivity. It's our belief that the degree of relationship, is not yet shown. We do not have a census in the technical community, but it's one area that we intend to look at in our future research.

Senator DURENBERGER. I think I've heard this before from Honeywell, where they go define employees' health in a variety of ways. It isn't just the cost of doctors and hospitals. They go into the environmental area.

You say their methodology is not yet of the sort that you would consider it to be accurate?

Mr. BRETTHAUER. I think the scientific community feels that we need more information before we can really make a conclusive statement, although there appears to be a relationship, but quantitating the degree of lost productivity is uncertain. I think the jury's still out.

Senator DURENBERGER. In my opening statement I referred to the need to get some help from EPA on this bill or a modification of this bill. Can you give us some idea of when we can get some advice from EPA?

Mr. BRETTHAUER. I believe the report and the bill are both tied up in the same exercise, Senator, and it will probably be summer, at the latest early fall.

Senator DURENBERGER. Beyond radon, asbestos, and tobacco smoke, do we have any idea of the health effects of other indoor air pollutants?

Mr. BRETTHAUER. Certainly we have some. Formaldehyde, for example, is an indoor air pollutant of considerable interest. It's contained in pressed board in furniture and in building materials.

Senator DURENBERGER. Can you give me an idea on formaldehyde, how much illness or death is caused by formaldehyde?

Mr. BRETTHAUER. Formaldehyde is considered a serious health risk. I don't have the numbers right at hand, Senator, but I can provide them to you.

[The information referred to follows:]

EPA RESPONSES FOR THE RECORD
MAY 3, 1989 HEARING ON INDOOR AIR QUALITY

1. Page 29, lines 18-20: (Senator Durenberger) can you give me an idea on formaldehyde, how much illness or death is caused by formaldehyde?

EPA Response:

In 1987 EPA classified formaldehyde as a Group B1-Probable Human Carcinogen, based on the determination that there is sufficient evidence that formaldehyde is an animal carcinogen and limited evidence that it is a human carcinogen. The evidence in animals showed that formaldehyde induced an increased incidence of rare, malignant nasal squamous-cell carcinomas in mice and rats, and in multiple experiments. Formaldehyde is not a proven human carcinogen; however, the limited human evidence comes from several epidemiological studies that show positive associations between respiratory site-specific cancers and exposure to formaldehyde.

The major non-cancer effects associated with exposure to formaldehyde are due to the irritating nature of this chemical. These effects are sensory irritation, readily perceived by the exposed individual; and cellular changes, which are less evident but still important. The effects from acute inhalation exposures are well documented in humans and are concentration dependent. These effects are usually reversible with termination of the exposure. Due to varying sensitivities, all individuals do not exhibit these acute effects at the same formaldehyde concentration. A large number of observations of people in various clinical and non-clinical settings support the conclusion that the generally observed range over which most people respond is 0.1-3 ppm of formaldehyde. Exposures greater than 3 ppm are generally intolerable for more than short periods. Non-occupational exposures, while highly variable, are generally at the lower end of the range at which acute effects are seen.

There are no data that would allow an estimation of the possible mortality that may be attributable to formaldehyde exposure. The available human data, while useful as evidence of a possible association between formaldehyde exposure and cancer, are not appropriate for making estimates of the extent of exposure-related disease in the population. It must be remembered that all people are exposed to mixtures of chemicals in the environment. Many of the people exposed to formaldehyde are also exposed to other agents, including tobacco smoke and chemicals in the workplace, and these agents may also contribute to the development of cancer.

Senator DURENBERGER. Do you have some others?

Mr. BRETTHAUER. Yes, but I just don't recall them this moment. If you will allow me to provide you—there are a number of other indoor air pollutants on which we have done a considerable amount of research. I just don't have the health effects information.

Senator DURENBERGER. Okay. Can you provide that for the record and respond to that question?

Mr. BRETTHAUER. Yes, I can.

Senator DURENBERGER. My final question is, how does the EPA interact with the GAO in regard to indoor air quality, or GSA, whoever does this, in regard to indoor air quality of Federal buildings? It must be GSA.

Mr. BRETTHAUER. I can't really answer that, Senator.

Senator DURENBERGER. Could you answer it for the record?

Mr. BRETTHAUER. Yes, I can. I can provide that answer to you, yes.

Senator DURENBERGER. Okay, thank you very much.

[The information referred to follows:]

2. Page 30, lines 1-9: (Senator Durenberger) Can you provide that [information on indoor air pollutants other than formaldehyde] for the record and respond to that question?

EPA Response:

There are other indoor air pollutants in addition to radon, asbestos and tobacco smoke for which we have information concerning possible associated health effects. The following are examples:

. Biological contaminants ("biologicals") include bacteria, molds and mildew, animal dander and cat saliva, house dust, mites, cockroaches and pollen. Some biologicals can trigger allergic reactions, including hypersensitivity pneumonitis, allergic rhinitis, and some types of asthma. Symptoms of health problems caused by biological pollutants include sneezing, watery eyes, coughing, shortness of breath, dizziness, lethargy, fever and digestive problems.

. Combustion products, including carbon monoxide, nitrogen dioxide, respirable particles, polycyclic aromatic hydrocarbons and acid aerosols are emitted from unvented kerosene and gas space heaters, woodstoves, fireplaces and gas stoves. At low concentrations, carbon monoxide (CO) can cause fatigue in healthy people and chest pain in people with heart disease. At higher concentrations, CO can cause impaired vision and coordination, headaches, dizziness, confusion and nausea. CO can be fatal at very high concentrations. Nitrogen dioxide can cause eye, nose and throat irritation, and may cause impaired lung function and increased respiratory infections in young children. Respirable particles can cause eye, nose and throat irritation; respiratory infections and bronchitis; and cancer, depending on the composition of the particles.

. Various organic gases can be released from diverse household products such as paints, paint strippers and other solvents, pesticides, cleansers and disinfectants, aerosol sprays and hobby supplies. Health effects associated with different organic gases include eye, nose and throat irritation; visual disorders and memory impairment; headaches, loss of coordination, and nausea; and damage to the liver, kidney and central nervous system. Many organics can cause cancer in animals; some are suspected or known to cause cancer in humans.

. Lead exposures can come from car exhaust, sanding or open-flame burning of lead-based paint, and soldering activities. Lead can cause impaired mental and physical development in both fetuses and young children; decrease coordination and mental abilities; and damage to kidneys, the nervous system, and red blood cells. Lead exposure may also be associated

with increased blood pressure in certain segments of the adult population.

3. Page 30, lines 10-13: (Senator Durenberger) My final question is, how does the EPA interact with the GAO in regard to indoor air quality, or GSA, whoever does this, in regard to indoor air quality of Federal buildings?

EPA Response:

EPA and GSA are two of the agencies which comprise the Federal interagency Committee on Indoor Air Quality. The CIAQ meets quarterly and formally offers the Federal agencies involved in indoor air quality an opportunity to share their current and planned activities.

In addition, EPA and GSA staff meet informally to discuss policy and research issues. For example, EPA (as well as other CIAQ agencies) commented on GSA's indoor air quality policy document, and GSA and EPA share a coordinated interest in research devoted to indoor air quality in large buildings.

Senator LAUTENBERG. Thank you very much, Senator Durenberger.

Thank you, Mr. Bretthauer.

We will now hear from the second panel this morning, the panel on the health effects of indoor air pollution. We'll call on Mr. Charles Lamielle, Ms. Marjorie Brown, Mr. Shapiro, and Dr. Bromberg.

Thank you very much for being with us this morning. You heard the rules that we applied to the earlier witness, and the rule that we applied is the 5-minute rule which we respectfully request that you honor. Anything that you fail to give in your oral testimony will be included in the record from your full statement.

We're grateful to have you all here. We'll start in this case from your right with Mr. Lamielle, having nothing to do with his home State of New Jersey. He just happens to be going first.

Welcome, Mr. Lamielle.

STATEMENT OF CHARLES LAMIELLE, ON BEHALF OF MARY LAMIELLE, DIRECTOR, NATIONAL CENTER FOR ENVIRONMENTAL HEALTH STRATEGIES

Mr. LAMIELLE. Good morning, Senator Lautenberg.

My name is Charles Lamielle. I am here representing my wife, Mary Lamielle, director of the National Center for Environmental Health Strategies. Mary is unable to be here today because she is one of the tens of thousands of individuals who must restrict daily activities including attendance at public meetings because of severe reactions to chemicals typically found in indoor environments. I am also accompanied by Linda Barran, a member of our board who is a victim of indoor pollutants in the workplace.

We are here today to bring to your attention the needs of those who suffer from chemical sensitivity disorders. The task before this committee to establish a comprehensive indoor air quality program at EPA is an urgent one. Indoor pollutants pose a significant public health hazard to all Americans. We strongly endorse and support Senate bill 657, the Indoor Air Quality Act of 1989.

Polluted indoor environments have been implicated in a number of specific illnesses. The EPA team study identified two chronic health effects from the collage of chemicals in the indoor environment, cancer and chemical sensitivity, and one acute health effect, sick building syndrome.

The National Research Council estimated that approximately 15 percent of the U.S. population has an increased allergic sensitivity to chemicals commonly found in household products. Tens of thousands of individuals are so debilitated by chemical sensitivity disorders that they have to make major lifestyle changes to cope with this illness. These are just the tip of the iceberg. There are hundreds of thousands more, the walking wounded, people trudging along trying to get by from day to day, having great difficulty at work, at home, and during other activities. Many are unaware that their chronic complaints are either caused or exacerbated by their own surroundings.

Indoor pollutants have produced a population of environmental refugees, some living as though under house arrest, their homes

stripped of many furnishings and consumer products; others living nomadic lifestyles, a few in specially-built trailers, but most in stripped-down mobile homes, in cars, in vans, tents, or sheds isolated from interaction with society and unable to earn a living or obtain many of the basic necessities of life. Some have gravitated into communities and some are among the Nation's homeless.

A couple of examples of these types of people: a high school senior in North Dakota has had to finish high school on a homebound program after developing multiple chemical sensitivities following exposure to newly-installed carpeting in the school building.

A 29-year-old Washington, D.C. office worker who has developed severe respiratory problems, dizziness, and multiple chemical sensitivities from working in an enclosed, newly-renovated office building with 100 percent recycled air.

A former Harvard law student poisoned by a common household pesticide now lives in a tent on the banks of the Blanco River in Texas.

The public, just like those with chemical sensitivity disorders, is hungry for information on indoor pollution. Many of the calls to the National Center for Environmental Health Strategies request information on availability of safe, nontoxic consumer products. The vast number of newsletters, magazines, and books on this topic reflect the growing public concern.

Presumably, research and educational activities mandated by the Indoor Air Quality Act will begin to provide the public with useful information in a timely manner.

It is critical that research and health advisories for indoor environments be developed and that these initiatives address the most susceptible populations.

Indoor air quality must be maintained at the highest quality for those at the greatest risk. The National Center for the Environmental Health Strategies has proposed several amendments to the Indoor Air Quality Act which address the needs of "populations at increased risk of illness" and those with chemical sensitivity disorders. Our proposed amendments are attached to our written statement.

We strongly recommend that a provision be added to the Indoor Air Quality Act to require research on the impact of indoor pollutants on chemical sensitivity disorders. We make this request based in part on the findings of a major report issued by the Ontario Ministry of Health, an NRC workshop, activities at the New Jersey Department of Health and a study prepared at the request of the Maryland Department of the Environment. These and other research efforts have recognized the seriousness of this complex problem and its intimate connection with indoor contaminants. The secretary of the Maryland Department of the Environment has called chemical sensitivity disorders "a problem of national scope."

In conclusion, indoor pollution is a significant health threat. Those with chemical sensitivity disorders suffer daily. We support and endorse the Indoor Air Quality Act. All Americans will truly benefit from it.

We urge the committee to adopt our amendments. Particularly, we need research to determine the interrelationship between this

debilitating illness and indoor pollutants so that we can protect its victims and avert further casualties.

Thank you, Mr. Chairman.

Senator LAUTENBERG. Thank you very much, Mr. Lamielle.

Mr. Shapiro.

STATEMENT OF STEVE SHAPIRO, EMPLOYEE OF THE ENVIRONMENTAL PROTECTION AGENCY

Mr. SHAPIRO. Thank you.

I'm employed by the United States Environmental Protection Agency, but I'm appearing here today not on behalf of my agency but because I am among those whose health and life have been radically affected by the indoor air at EPA headquarters.

A year ago, longstanding problems relating to the air quality at Waterside Mall, EPA's central headquarters site, came to a head when clusters of people in several locations with new carpet became ill. When this was reported to EPA Facilities Management, no action of any type was taken to identify and remove the suspected sources of contamination.

Building renovations continued and additional employees became ill. Within one branch, eight out of twenty-five people were affected. Four had to stop working at the building and four had significant health problems.

By May, there were seven of us in the Mall and East Tower areas who had become so severely affected that our doctors advised us to try to arrange working out of our homes or at some other location. None of the suspected sources of this outbreak of illness, including the new carpeting, was ever removed.

Subsequently, at least seven others have had to stop working at Waterside. Many of us have had a generally frustrating time getting the agency to act responsibly, responsively and competently.

I believe that if management had initially taken the problem seriously and taken immediate action under the terms of its own indoor air policy, we could have been spared the trauma and distress of this illness.

The overall air quality problems at Waterside are many and complex. Even with the many resources at its command, EPA has at best had a difficult time dealing with these problems and with the epidemic in the building over the last year.

The 100-plus employees who have gone to the Health Unit over effects from indoor air pollution are just the tip of an iceberg. The occupational health physicians some of us have seen say the most common problems include upper and lower respiratory irritation, intoxication-type syndrome, occupational asthma, and chronic hypersensitivity pneumonitis. The effects on the central nervous system experienced by many of us don't lend themselves to ready diagnosis. Reproductive effects are a concern as well.

Although our illness was preventable, none of us except for some of those who have become ill this year were warned. Some are able to function in most buildings other than Waterside. Some have no problem visiting hazardous waste sites for a week at a time, but become ill after 15 minutes inside Waterside.

Some have become progressively more reactive. I'm speaking of reactions to parts per million, billion, or even trillion of substances or combinations where reactions are normally associated with parts per thousand.

Illness from indoor air does not respect age or health. Most of us who can no longer work inside Waterside have not had a history of allergies.

When someone who works at EPA comes to understand that he or she is becoming ill from exposure to a chemical or combination of chemicals in the air, workers, supervisors, management, and treating physicians may embark on a long road of decisionmaking.

As a worker, you have to choose whether to tough-out feeling sick in the hope that it will pass, although not attending to your illness may result in worse illness; or try to take care of yourself, although this may result in disruptions to your work and ultimately your career, your organization, your personal welfare, and your family's welfare. A common choice is to deny that you should do anything about the problem.

Supervisors face issues of how to keep a worker integrated in the organization. What are a secretary and supervisor to do when the secretary can't be in the office to handle paperwork and telephones and help others as needed?

Our lives are full of surprises. You walk into a place you thought safe, only to be caught in fumes from paint, cleaning agents, perfume, nail polish, common magic markers, white-out, new furniture, deodorizers, pesticides, electronic equipment and jet ink printers, plastic objects, plastic wrapping, glue, mastics—the list never ends.

Here are some recommendations:

People who run buildings need to be trained in the rudiments of public health and need an algorithm to evaluate a building and to evaluate problem areas within a building.

Standards for acceptable indoor air quality should be reevaluated to account for building renovation, carpeting, electronic equipment, and biological agents, and address air quality for all persons—healthy, sick, allergic, and chemically reactive.

Building codes should be developed to integrate good indoor air quality principles.

An indoor air quality certification authority should be created so that buyers, renters, occupants, and visitors can have standardized site-specific information.

The hazards of chemicals used throughout buildings should be labeled. Building managers, occupants, and visitors have a right, need, and responsibility to know and address these hazards.

Special efforts should be made to identify chemicals or combinations which at very low concentrations can produce adverse health effects.

An initiative should be undertaken to research the causes, treatment, and prevention of chemical hypersensitivity.

Programs should be developed to establish air quality advocates in buildings.

Criteria should be developed for an approach to prevent, monitor, and deal with incidents of building-related sickness.

A Federal program should be established to address the personal condition of those who become sick from indoor air. This should include special advocacy, medical treatment, financial assistance, and vocational rehabilitation programs for seriously affected people.

In conclusion, few health problems occur in only one place and at only one time. I believe that what happened to us at EPA has happened elsewhere. What happened to us demonstrates the failure of OSHA's system of permissible exposure limits and threshold limit values and the failure of EPA's system of regulating chemicals under the Toxic Substances Control Act to protect our health.

I believe that these inadequate systems are leaving a wreckage of human lives in their wake. It is past time to change how we protect people from these chemicals.

Senator LAUTENBERG. Thank you very much, Mr. Shapiro.

Dr. Bromberg, we invite you to testify at this point.

STATEMENT OF DR. PHILIP BROMBERG, DIRECTOR, CENTER FOR ENVIRONMENTAL MEDICINE, SCHOOL OF MEDICINE, UNIVERSITY OF NORTH CAROLINA, ON BEHALF OF THE AMERICAN LUNG ASSOCIATION, WASHINGTON, DC

Dr. BROMBERG. Thank you, Mr. Chairman and members of the subcommittee.

I'm Dr. Philip Bromberg. I'm director of the Center for Environmental Medicine at the University of North Carolina's School of Medicine and I am a practicing physician as well, with my subspecialty in pulmonary diseases. I am here today representing the American Lung Association.

The ALA is our Nation's oldest voluntary health organization and is dedicated to the prevention and control of lung disease. The American Lung Association, along with its medical section, the American Thoracic Society, has long recognized the contribution of air pollution, both indoors and outdoors, to the development or exacerbation of respiratory disease.

The ALA has been implementing programs to insure healthful air quality since 1966. I have personally had the opportunity to appear before this Subcommittee on Environmental Protection on prior occasions to discuss ambient air pollution in the outdoor environment.

Outside of the workplace, air pollution in the past has been perceived as primarily an outdoor problem with the indoor environment providing a so-called refuge from outdoor pollution. Although this may, indeed, be true for a pollutant like ozone, the indoor environment is often even more polluted than the outdoor environment.

Furthermore, the average individual spends from 75 to 90 percent of the time indoors, and this percentage is even greater for infants and very young children.

A rapidly enlarging body of literature has described sources of pollutants and exposures to different pollutants in the indoor environment. While many putative health effects of indoor pollutants remain controversial, some effects have been described with certainty and should be considered clinically relevant.

In March of last year the ALA medical section, the American Thoracic Society, convened a two-day workshop on the subject of control of indoor air quality and health. This was prompted by the dispersion and controversial nature of published information in the area and the need for critical review of the evidence by an appropriately multidisciplinary group of experts.

It was held at a time when emerging information on health effects had led to questions concerning control approaches. The ALA regarded the workshop as an important step in providing scientifically-grounded advice to physicians and the public on control of indoor air pollution. The procedures are in the process of publication as a supplement to the journal, "The American Review of Respiratory Diseases," and will, of course, be made available promptly to this subcommittee.

Although indoor air pollution is now recognized as a public health problem, probably at least as serious outdoor air pollution, the Federal Government has not heretofore specifically identified it and targeted it for action in a coherent manner.

The present bill corrects this situation in an exemplary manner, building on existing resources, but defining a coherent, new program and assigning primary responsibility for its implementation to the Environmental Protection Agency. Importantly, the bill also authorizes the appropriation of new funds specifically for this new program.

I will not describe the general contents of the bill, as this has already been very clearly and eloquently presented. I will merely summarize a few of ALA's comments and recommendations regarding specific provisions of S. 657 by indicating that we think that the National Institute of Environmental Health Sciences should be included among the Federal agencies listed in sections 5 and 10.

We suggest consideration of expansion of the budget resources for section 5, and we suggest a more rapid time frame for development of the health advisories discussed in section 6 of the bill.

In summary, the American Lung Association strongly supports S. 657 as a carefully crafted bill that represents a well-reasoned and potentially effective initial approach to controlling the range of health effects caused by indoor air pollution.

As we have advised about outdoor air pollution, we cannot wait for all of the answers before we take action. The American people merit a safe, healthful environment indoors as well as outdoors. The ALA believes that prudent public health policy requires enactment of S. 657 and applauds the leadership of this subcommittee in developing this farsighted legislation.

Thank you.

Senator LAUTENBERG. Thank you very much, Dr. Bromberg.

Ms. Browne, we invite you to give us your statement. Once again, whatever you don't include in your oral presentation, if it's in your written statement, will be in the record.

STATEMENT OF MARJORIE BROWNE, CONGRESSIONAL RESEARCH EMPLOYEES ASSOCIATION, LIBRARY OF CONGRESS

Ms. BROWNE. Thank you, Senator.

My name is Marjorie Browne. I'm here on behalf of the Congressional Research Employees Association at the Library of Congress, but my statement really covers the experiences of other Library staff as well. My statement does not, however, reflect the policies or views of the Congressional Research Service, the Library of Congress, or the Library's Joint Labor/Management Health and Safety Committee of which I'm a labor member.

As was referred to earlier, this year over 80 percent of the Library staff in the Madison Building filled out an extensive indoor air quality survey administered by the EPA, the National Institute for Occupational Safety and Health, and Yale University's John B. Pierce Foundation. This questionnaire and a week of environmental monitoring and sampling make up the start of a pilot study of the Madison Building work environment, including indoor air quality.

Unfortunately, even preliminary results of this study will not be available before July. However, the study is the result of nearly nine years of persistent staff and labor organization complaints and unending difficulties in assuring adequate ventilation throughout the entire building in a consistent way.

The staff descriptions of ventilation or air-related problems have included the following, and these are more extensively laid out in my statement:

Temperatures are either too cold or too hot.

There's no air circulation or there are drafts and too much air.

The air is very dry or there's excessive humidity.

At times the air smells like either wet dog or dead fish.

Odors of grilled food permeate some office spaces, office spaces that are not really close to the cafeteria or coffee shop on some days, and those odors are absent at other times.

Many staff have experienced an increase in the number of respiratory illnesses while others can no longer wear their contact lenses in the building.

Many have told me that by the end of a day or a week in the building they just don't feel right. Yet, a few hours after leaving the building, they feel rejuvenated.

In this brief time, what I will do is just state one specific case—I have three mentioned specifically in my testimony—that was recently brought to my attention. It concerns an employee whose office usually has very poor air circulation—dead air, we call it.

After starting to work in the Library in late 1987, the employee began to have frequent respiratory illnesses, very unusual for her. She experienced respiratory distress, fluid in the head and chest, fever, and marked fatigue. Of course, this meant she also lost time at work.

After eliminating the possible causes for the increase in respiratory illnesses, her physician sent her to an allergist who found she had developed an allergy to at least one form of mold. Further, her recent annual physical examination revealed that over the past year she has now lost significant lung function capacity. She's a singer, so she's well aware of lung capacity and lung control, breathing control.

Both her physician and allergist attribute this loss to the allergy. While a direct causal connection has not yet been made between

the allergy and the poor indoor air quality in the employee's office, there would seem to be a high probability for that connection. There are stories like this in places throughout the Library in the Madison Building.

In conclusion, because I want to make this brief, the Congressional Research Employees Association urges the committee to insure that the Library of Congress is included under the jurisdiction of this legislation. My statement does identify, for example, that the Library Building is one of those under the jurisdiction of the Architect of the Capitol, and it just isn't clear to us whether, indeed, Library of Congress buildings would be included fully under the legislation and employees could benefit from the same kinds of reporting requirements and things of that sort that would be in other Federal buildings.

Senator LAUTENBERG. Thank you very much.

The hearing today is a first in many ways, not the least of which is the dramatic perspective that we get from people who are directly affected and how that perspective differs from those who are not generally aware or who aren't affected.

The other is that you all finished within the time that was allotted, which is something short of a miracle. I think this probably goes in the Guinness Book of Records, that all four panelists got their work done before the clock went off.

Again, I'd have to speak for myself. I honestly didn't realize the depth of the problem for some people as severe as it is. We hear Mr. Lamielle's description of the condition that some people have to live with, describing them as refugees, homeless in effect. That's quite shocking to hear.

Dr. Bromberg, is there anything that you heard from any of the other people on the panel that comes to you as a surprise or raises any doubts in your mind. Talk as frankly as you can. We're trying to get to an approach here that permits us to work out a problem. An ideal will never be reached.

We are in buildings. We do use materials. To change that culture, to change that habit is going to take longer than any of us here in this room are going to be on earth.

The severity that's described by some of the people in their testimony, the volume of people affected, is any of that challengeable scientifically? You spend your time with this.

Dr. BROMBERG. I'm not surprised by the testimony. If I by extrapolating from certain situations that are now relatively well understood, when Mr. Shapiro talks about parts per billion and parts per trillion of a chemical in the air, I can think in terms of the commonly used chemical toluene diisocyanate, TDI. Some workers who have been exposed to this chemical develop a remarkable hypersensitivity to the chemical, so that subsequent exposures in the range of parts per billion and even parts per trillion clearly cause effects on the respiratory system and provoke asthma in these patients.

Not only that, but in the case of TDI and some other agents that have been studied, the asthma does not necessarily disappear even when, to the best of our understanding, the person is totally withdrawn from additional exposure to the chemical. Now whether that's because a permanent change has been induced or whether

there is still some trace of TDI in the air even outside the industrial environment, I don't know. In any event, TDI-induced asthma represents one clear example of an acquired sensitization to a very, very low level of material that's present in the air of the workplace.

In terms of the sick building syndrome, there is no question that one of the potential causes of such problems is the colonization of moist surfaces in air ducts of buildings with closed air circulation systems by fungi that like to grow on those surfaces. The spores of these fungi float in the air, and the individual who develops an immunologic mechanism for hypersensitization can, indeed, develop serious pulmonary problems as a result of repeated exposure to low levels of this specific antigen in the air.

In that sense, I'm not surprised by these anecdotal histories.

Senator LAUTENBERG. Are we in an impossible situation? Here you talk about conditions developing as a result of excessive humidity or moisture. Most of the complaints that we hear are excessive dryness. Are we faced with a situation that says that's life in the real world, different people respond differently to the environment—indoor, outdoor? Most people are allergic to something, lots of people are allergic to grass and to other things in nature. Do you think we can resolve these problems? If it's dry for some, is it going to be too moist for others when we change that condition?

Again, the human body being what it is, has certain immunological stresses. When it breaks down, some of us get terrible diseases and others manage to function with it.

Dr. BROMBERG. Indeed, we may not be able to protect everyone against every eventuality, but in the case, let's say, of the thermophilic actinomycetes that like to grow on warm, moist surfaces, one can pay attention to engineering considerations that might be able to keep those surfaces sterile.

A similar problem also occurs in hospitals. You cannot afford to have aspergilli growing in your air distribution system because you will disseminate aspergillus to patients, especially those with various types of suppression of defense mechanisms to this particular organism. You can't simply say, "Well, that's the luck of the draw!" You've got to look at the engineering of your duct systems and take precautions, put in filters.

There are technical solutions to many of these problems.

Senator LAUTENBERG. Part of what we would like to examine is whether or not building materials and structures should be regulated.

Mr. Lamielle, I know that it was not easy for you to give your testimony because you live with the problem in a very meaningful way.

When did your wife begin having problems with chemical sensitivity?

Mr. LAMIELLE. Mary became ill in, I guess, late 1978, early 1979 with a number of different maladies that doctors thought were prelupus syndrome, other types of problems like that.

Her health, her immune system just completely collapsed by 1980, and she was no longer able to work. By April of 1980 she applied for a disability.

Senator LAUTENBERG. What did you do to the house to cleanse the air there?

Mr. LAMIELLE. Well, I have small air filters within the house, but it's an older house so we don't have a lot of the problems with pollutants from products. One of the causes of her problem, we did try to remodel the house in 1978, and whatever we brought in through carpeting, furniture, wallpaper, and everything like that just was probably one of the final straws of Mary's total collapse.

Her disease originated, I think, from an overexposure, a prolonged exposure to a sewage treatment plant in Voorhees Township, New Jersey where I live. The treatment plant had been in violation of the Clean Water Act for a number of years and was dumping sludge and everything else into the Cooper River. We lived within 1,000 feet of it.

From 1965, when she was a young woman, up until we were married, until she became sick, that impact on her immune system just totally collapsed it. Plus, there was another exposure to a major gasoline spill into the Cooper River again where she went into convulsions and I had to rush her to the hospital.

She is pretty much completely housebound. She has not been within a mile or two miles from our home in four or five years.

Senator LAUTENBERG. You've been able to get the air quality to the level that accommodates her needs?

Mr. LAMIELLE. It's tolerable to some extent. It's not as good as it should be. I cannot afford financially to do the work necessary. There are a number of filtering systems that could be used. We could build a clean room. I've had estimates of $50,000, $60,000, $70,000. I don't make that kind of money.

Senator LAUTENBERG. Are there any government agencies providing information, to your knowledge, to people with chemical sensitivities?

Mr. LAMIELLE. No.

Senator LAUTENBERG. What do you think the role at EPA ought to be?

Mr. LAMIELLE. I think EPA has to get onto the problem. I think, as I said in my written statement, my wife's written statement, they have to get into the research area. We have to develop strategies. We have to develop advisories. We have to develop limits as to what people can be exposed to. The toluene, as the doctor mentioned, formaldehyde, as the representative from the EPA mentioned—these are major chemicals that in combinations are making people deathly ill.

Senator LAUTENBERG. If I may ask a question, if you don't mind answering, what's your professional status? What do you do?

Mr. LAMIELLE. I'm an administrative contracting officer for the Defense Logistics Agency.

Senator LAUTENBERG. You've, unfortunately, gained a lot of knowledge about this subject, but you don't do anything professionally that would provide you with this——

Mr. LAMIELLE. No, I get involved on the periphery with my wife. I act as her spokesman when I possibly can. She, unfortunately, as I said, could not be here. She has developed in the past three or four years a good data base and she's being well rewarded with our phone calls. My phone bills are $300 a month, which is another

thing I can't afford, but it's necessary to be done. She is a major contact for a lot of people. She's built a reputation.

Senator LAUTENBERG. Do you have children?

Mr. LAMIELLE. Unfortunately, my wife became ill before we could have children.

Senator LAUTENBERG. There's no one else living in the house——

Mr. LAMIELLE. My mother-in-law.

Senator LAUTENBERG [continuing]. Who's developed any problems?

Mr. LAMIELLE. My mother-in-law has some sensitivities. My father-in-law now lives in Texas. He is similarly afflicted as is my wife. Again, he was living in the area of close proximity to the sewage treatment plant for a number of years, and he worked with microwave and radar systems at a defense contractor for a number of years, from I guess the end of World War II up until the middle sixties.

Senator LAUTENBERG. That brings into question whether or not contaminated water made a larger contribution to the problem than might have been expected.

Dr. Bromberg, do you see EPA paying attention to this problem in any way that gives you encouragement?

Dr. BROMBERG. I must——

Senator LAUTENBERG. Don't be diplomatic.

Dr. BROMBERG [continuing]. Say that I perceived EPA as being loath to step into the vacuum of indoor air quality responsibility. I think one might point at other Federal agencies and say that they, too, have been loath to take this on.

The workplace has been the province of NIOSH on the research side and OSHA on the control and monitoring side, but they have not been terribly eager to step in.

I think one of the important features of this legislation is that it resolves this issue of responsibility for dealing with indoor air pollution. It's not that other agencies have not been to some extent interested in the problem, but the legislation does designate EPA as being authorized and responsible except for certain areas that other agencies like NIOSH would be involved in.

Senator LAUTENBERG. Just a perspective from you. The proposed EPA report, which is still not in everybody's hands, recommends $100 million of investment on the subject of indoor air research, implementation, staffing, et cetera. Do you have any kind of feel for whether or not we can accomplish our objectives with that kind of a financial commitment?

Dr. BROMBERG. That was $100 million over a five-year——

Senator LAUTENBERG. Yes, it's $20 million a year.

Dr. BROMBERG [continuing]. Over a five-year period. I would say that that is a modest amount of money over a five-year period. I believe the bill authorizes sums that are substantially more realistic. I think that one might look at how the program develops——

Senator LAUTENBERG. I'm reminded that is for the research portion only. There's roughly an additional $100 million that we're proposing in our legislation for program implementation, but on the research side of things——

Dr. BROMBERG. I would think that to really implement a program like this you will have to count some start-up time and that will

require some perhaps smaller initial outlays and then some increase in level of support as the program develops.

Senator LAUTENBERG. Is there a lot of research going on on the campuses around the country?

Dr. BROMBERG. Yes, I think there is a very substantial amount that is relevant and applicable. On our own campus my colleague, Dr. Collier, is conducting extensive studies of the effects of indoor air quality, multiple components of indoor air, on respiratory health in growing children. We have reason to believe that the young child with a developing lung is particularly sensitive to the effects of insults of inhaled substances.

Senator LAUTENBERG. Is there, a central data bank, where this information is collected and coordinated?

Dr. BROMBERG. I think it's currently in the medical and scientific literature, in proceedings of conferences, etc. Efforts are clearly now being made to use the workshop format and to thus be able to publish the proceedings of workshops that attempt to pull this kind of information together.

In order to develop a real data bank, you will have to think in terms of a major agency commitment to gathering such a data bank.

Senator LAUTENBERG. For all kinds of reasons: confidentiality, et cetera, of research programs.

I want to ask Mr. Shapiro: it's kind of ironic that you work in the place responsible for monitoring it. That's the old story of the cobbler, I guess, whose shoes are never fixed. He fixes everybody else's.

Does EPA disseminate information to the people working in the facility about indoor air quality at all?

Mr. SHAPIRO. Historically, what happened, was a year ago with many people getting sick, the only information—the first information that broke widely inside the Agency was when The Washington Times in late April came out with a story, which an employee put on the bulletin boards. Within a month there was a demonstration called by the Committee of Poisoned Employees at EPA. A leaflet was put out on the 23rd of May calling for a demonstration on the 25th, and by the 24th there were two all-hands bulletins by the administration advising employees that work was being done on indoor air quality and on problems relating to the carpet.

Senator LAUTENBERG. Did EPA disseminate any information about indoor air pollutants to the public, to your knowledge?

Mr. SHAPIRO. To the public?

Senator LAUTENBERG. Generally.

Mr. SHAPIRO. The booklet, "The Inside Story: A Guide to Indoor Air Quality" has been widely disseminated, as far as I know.

Senator LAUTENBERG. Ms. Browne, how about within the Library? Is there any agency or institutional information circulated among employees?

Ms. BROWNE. When there are special circumstances such as, for example, before the EPA-NIOSH study, special announcements would come out. I think that the labor organizations and the Library's joint health and safety committee have been used from time to time as mechanisms.

The health and safety committee conducts inspections, health and safety inspections, of all Library space. Thus, when we find a problem and we ask questions of staff as we're going through the space, we will write it up as a hazard and then there has to be some response provided by the Library or the engineers.

Now what staff have done and what we encourage people to do is to call the engineers when they have a ventilation-related problem or they smell something out of the ordinary, or whatever, have them call the engineers so that a specific problem can be addressed. That happens on many different occasions.

Senator LAUTENBERG. Thank you all very much for your testimony.

Now I would like to call the last panel, including Mr. Brobeck, Dr. Cammer, Mr. Schlein, and Mr. Bisk.

We welcome you. You heard the time rules. You heard also that whatever you don't manage to say in your oral testimony will be included in the record in your full statement.

Since we started from the right side of the panel before, we'll continue in the same order. It's five minutes. Mr. Brobeck, we invite you to give your testimony first.

STATEMENT OF STEPHEN BROBECK, EXECUTIVE DIRECTOR, CONSUMER FEDERATION OF AMERICA

Mr. BROBECK. Thank you, Mr. Chairman.

The Consumer Federation is pleased for the opportunity to support S. 657. This legislation represents the single most important action that Congress can take to address the Nation's No. 1 hidden health hazard.

Most indoor air pollution cannot be seen and much of it cannot be smelled. So it is not surprising that, except for radon, the public is less aware of indoor pollution than of most other environmental hazards. Yet, in its 1987 assessment of 31 such hazards, the Environmental Protection Agency ranked radon first and indoor air pollution from other sources fourth as a threat to public health.

These conclusions were based on careful scientific studies such as the examination by Oak Ridge Laboratories of indoor air quality levels in 40 homes. In each Oak Ridge found between 20 and 150 hazard chemicals in concentrations 10 to 45 times that of the outdoors. No wonder, then, that indoor air pollution is estimated to cause tens of thousands of deaths and millions of injuries each year.

These adverse health effects, however, are not the extent of the damage. Indoor air pollution also imposes substantial economic costs on our society. Several years ago the Consumer Product Safety Commission estimated that indoor air pollution costs our Nation as much as $100 billion a year in medical costs and lost days at work. Using the conventional economic estimate of a human life is worth a million dollars, just the 5,000 to 20,000 cancer deaths from radon each year and the 3,500 to 6,500 cancer deaths from non-radon indoor air pollution would impose costs of roughly $8.5 to $26.5 billion on our society. EPA estimates, in the report you just released but I have not seen, apparently are even higher.

From this perspective, the less than $50 million in expenditures that S. 657 would require annually is a modest sum. If the legislation were to reduce these deaths by only 10 percent or even 5 percent, it would pay for itself many times over.

Finally, I would note the growing support for the measures in S. 657. In particular, I would call the committee's attention to support for all its key provisions by the new Coalition for Consumer Health and Safety.

This landmark alliance includes not only most major consumer and health organizations, but also many of the Nation's largest insurance companies and trade associations. Coalition members are the Alliance of American Insurers, Allstate Insurance Company, the American Academy of Pediatrics, the American Association of Retired Persons, the American College of Preventive Medicine, the American Council of Life Insurance, Americans for Democratic Action, American Insurance Association, American Lung Association, American Public Health Association, Center for Auto Safety——

Senator LAUTENBERG. We'll take that list. We'll copy it. (The list appears at p. 109.)

Mr. BROBECK. Thank you.

Senator LAUTENBERG. It's a good list.

Mr. BROBECK. I wanted to read it because most of the major health, consumer, and insurance organizations are part of this coalition.

Recently the Coalition released a consumer health and safety agenda that I believe you have a copy of, Mr. Chairman, that recommends policies for mitigating a broad array of product-related risks including those caused by indoor air pollution.

The document makes the following recommendation on the latter. I'm quoting now:

> The Coalition supports a comprehensive examination of indoor air pollution. A legislative initiative containing key features of the Indoor Air Quality Act represents a sound approach for implementing such an examination.

The document then goes on to list the major provisions of S. 657. We will make this document available to all committee members and request that its section on indoor air quality be entered into the record. (See p. 109.)

Our broad-based coalition endorses the provisions of S. 657 because the legislation represents a sensible, balanced response to a serious health threat. We commend you, Mr. Chairman, and other cosponsors for your concern and your initiative.

Thank you.

Senator LAUTENBERG. Thank you very much, Mr. Brobeck. That's an impressive list of companies including the Prudential Insurance Company from New Jersey and the other very, very large insurance companies in the country.

Also, that report has some fairly important comments to make about indoor air quality and its effects on our society.

Mr. Bisk, would you like to testify next?

STATEMENT OF ALLAN S. BISK, EXECUTIVE VICE PRESIDENT, ROSE ASSOCIATES, REPRESENTING THE BUILDING OWNERS AND MANAGERS ASSOCIATION INTERNATIONAL

Mr. BISK. Mr. Chairman, members of the subcommittee, my name is Allan S. Bisk, executive vice president of Rose Associates, Inc. and chairman of the National Advisory Council of the Building Owners and Managers Association International.

I would like to begin my testimony by commending you and your subcommittee for scheduling this hearing on the Indoor Air Quality Act, S. 657. BOMA supports and shares your concern that a comprehensive and coordinated program of research and development is needed if we are to identify the nature, the cause and extent of indoor air contaminants and reduce the effect they may have on human health.

The success of any building owner or manager is predicated on their ability to provide safe, healthy buildings and workplace environments. BOMA is committed to research on indoor air contaminants and will continue to take the lead in identifying solutions.

We were founded in 1907 and BOMA is the oldest and largest trade association representing the office building industry. We have 7,200 members who own or manage about 5 billion square feet of office space in North America.

In efforts to comply with legislated energy conservation guidelines and to lower energy costs, building managers have resorted to tightening buildings and shutting down air conditioning systems at nights and on weekends. Attempts to save energy through the redesign of HVAC systems have made important contributions toward saving global energy supplies.

Concerns with the consequences of our energy conservation efforts led BOMA International to join with other industry groups under the auspices of the United States National Research Council Building Research Board in designing a guideline entitled, "Policies and Procedures for Control of Indoor Air Quality."

In 1987 BOMA participated in, along with scientists from 35 countries from the United Nations, and sponsored the Indoor Air 1987 Conference in Berlin. Last year BOMA International was invited to present a paper on behalf of our industry at the Joint United Nations. This was a conference on healthy buildings in Stockholm.

BOMA International was pleased to cosponsor, along with the United Nations, Environment Canada and the U.S. EPA Indoor Air 1990 which will be held in Toronto, Canada.

Last year BOMA worked closely with the Senate Environment and Public Works Committee to refine this bill's predecessor, S. 1629, while upholding the goals of legislation.

Before I share with this subcommittee a description of BOMA's perspective on S. 657, I would like to touch upon two important points relative to indoor air quality legislation. First, I strongly urge this subcommittee to pursue an objective discussion of the causes of indoor air problems. Where building-related indoor air problems exist, they are often sensationalized by misappropriated labels such as "sick building syndrome." The value of rational solutions has been diminished. In many instances indoor air problems

can be directly traced to specific sources. More often than not, correction of an air quality problem can be addressed by simply replacing a building component or readdressing a maintenance issue.

Buildings which experience air quality problems are the exception, not the rule. Where complaints exist, they may be attributable to discomforting temperature or humidity levels, objectionable odors or poor air circulation. Some of these are within the capability and resources of the building owner and manager to address.

Many general working conditions which affect an employee's level of workplace satisfaction are beyond the purview of the owner or manager, but the responsibility of tenants, design professionals, contractors, suppliers, and others.

A second point I would like to make addresses the regulatory nature of S. 657. It is BOMA's position that such measures effectively create a regulatory program. This program would include the listing of indoor air contaminants, the publication of health advisories with concentration levels, EPA's supporting actions which would result in the development of regulations and grants to States to develop regulations, building assessment recommendations, and measures to reduce pollutant concentration levels.

Nevertheless, I'm pleased that you and your colleagues have gone a long way toward providing legislative guidance to the EPA. I urge you to examine carefully standards for listing contaminants and defining safe levels of concentration, establishing response to contaminant concentration and providing requirements for adequate public notice and comments.

BOMA is particularly concerned that the Nation avoid the health, safety, public relations, and economic debacle which has characterized the asbestos crisis since the early 1980s. The transformation of the public's perception of asbestos from miraculous fire retardant to potentially dangerous carcinogen has dramatically altered the way buildings are managed, marketed, leased, and sold.

The irrational panic which has gripped the real estate marketplace and was fueled by inappropriate public pronouncements about the presence of asbestos in buildings by Federal authorities has led to requests for purchase discounts, et cetera.

I think, in conclusion, we support S. 657, the Indoor Air Quality Act of 1989. We are particularly pleased with the inclusion of many of their provisions. BOMA welcomes the opportunity to work with this subcommittee in fashioning a coordinated program of indoor air quality research. We recognize our responsibility to be part of the solution and provide quality indoor environments for our employees, our tenants, and their employees.

I thank you.

Senator LAUTENBERG. Thank you very much, Mr. Bisk.

We will now ask Mr. Schlein for his testimony.

STATEMENT OF DAVID SCHLEIN, NATIONAL VICE PRESIDENT, AMERICAN FEDERATION OF GOVERNMENT EMPLOYEES, AND COCHAIRMAN, SAFE WORKPLACE AIR COALITION

Mr. SCHLEIN. Thank you, Mr. Chairman.

Before I begin, I would like to acknowledge the presence of offices from AFG's Local 476 at HUD, Local 3331 at EPA, Local 12 at

the Labor Department, and Local 41 at HHS who are in the audience today.

The American Federation of Government Employees is pleased to support S. 657. We hope our comments will help make a good bill even better.

Just two months ago our union released the preliminary results of a survey of Federal and Washington, D.C. government employees. More than 90 percent reported experiencing physical symptoms often associated with indoor air quality. There is a serious cost to the Government in not addressing these problems. These costs result from increased use of sick leave, decreased productivity, health care and workers' compensation costs.

While the search for new knowledge about the causes of health effects of indoor air quality are laudable, we would like to see a balanced approach to the problem with equal emphasis on three issues of research, remediation, and compensation for victims. The funding in the bill should be adequately apportioned among these three activities.

We believe that Congress should act on legislation to make the Federal Government a model employer, setting the pace for the rest of the Nation and addressing and correcting indoor air quality problems.

A national survey of Federal employees should be conducted as a priority item. While the research continues, the cleanup should begin.

To that end, we support an extensive program of demonstration projects. Based on our experience, we call on projects to begin at USIA, HUD, the Department of Labor, the Census Bureau, the Parkon Building of HHS, Defense Mapping, and EPA.

While regrettable, it is true that none of the Federal agencies with responsibility for indoor air quality have thus far distinguished themselves. EPA has tragically underplayed and all but ignored the plight of over 100 of its employees, and their testimony, unfortunately, today still confirms my opinion.

OSHA and NIOSH's combined efforts in this area can best be summed up in one word—underwhelming. But GSA, the Nation's landlord, has had such a singularly bad record in this area that we seriously question the advisability of giving GSA a share in the leadership role of administering the Federal Government's indoor air quality program.

Three dramatic examples of indoor air pollution have recently demonstrated GSA's unwillingness to address the IAQ problem. In early 1988 workers at EPA headquarters began to suffer physical ailments after their building had been remodeled and new carpet and partitions were installed. Several employees can no longer enter the building.

At USIA preliminary studies revealed a series of indoor air quality problems. To date, no action has been taken.

Last summer HUD was given a rate break by PEPCO if they cut down their energy use. Not surprisingly, air conditioning was provided to the offices of political appointees, meaning that in other areas of the building the system had to be completely cut down to reach the energy use reduction levels.

GSA's most recent strategy has been to shift responsibility either to the agencies or private building owner. GSA then refuses to act on employee complaints because they claim they don't have control of the building.

To alleviate this problem, we recommend that the bill include a provision requiring all GSA leases to contain a provision for regular IAQ testing and monitoring. Because of GSA's long record of opposing health and safety measures, we strongly recommend that the Federal Occupational Safety and Health unit of OSHA be given responsibility for a testing program in Federal buildings.

We also recommend that jurisdiction for the elements of the bill that deal with workplace IAQ be shifted from EPA to OSHA. OSHA officials, however, should be asked to demonstrate to the committee how it would allocate resources in order to meet the new responsibilities of this act.

AFGE represents several thousand District of Columbia employees. From their response to our survey, I know there are serious problems in many D.C. buildings. I hope that the District is classified as a State under section 9 and will be eligible to participate in the AIQ program.

I am confident that if we work together, we can make significant progress in dealing with this important issue. To that end, we suggest that section 11 of the bill be amended so that the Federal Indoor Air Quality Council include representation from AFGE and other major Federal unions.

Mr. Chairman, we commend your work and the work of the committee on this very important issue. I'll be glad to answer any questions.

Senator LAUTENBERG. Thank you very much.

Dr. Cammer.

STATEMENT OF PAUL CAMMER, PRESIDENT, BUSINESS COUNCIL ON INDOOR AIR

Mr. CAMMER. Thank you. Good morning.

My name is Paul Cammer. I am president of the Business Council on Indoor Air or BCIA. I am pleased to be here to present BCIA's views on S. 657.

BCIA represents a wide range of industries interested in indoor air quality. Our membership is composed of firms with analytical and engineering experience in monitoring, controlling, and improving the quality of the indoor environment, as well as manufacturers of chemicals, consumer products, and building materials.

We agree with Senate Majority Leader George Mitchell and Senators Lautenberg and Durenberger, and the other sponsors of the legislation, that preserving indoor air quality is of primary importance and that EPA should be directed toward identifying indoor air quality problems and finding the most efficient methods to remedy those problems.

We fully agree that further research activities on indoor air are needed and that these activities must be coordinated. We also believe that research efforts should be prioritized and focused so that the most promising steps to improve indoor air quality can be evaluated and implemented.

We do have concerns, however, about the potential regulatory implications of the bill. In particular, we believe that the listing of contaminants and the health advisories called for in section 6 and the regulatory action requirements in section 7 should be reconsidered.

Before elaborating on these concerns, I would like to return briefly to the question of research prioritization. BCIA believes that the following criteria should be used in establishing priorities for indoor air research at the Federal level.

No. 1, while we recognize that not all indoor air quality problems can be avoided through any single method, it is clear that a majority of potential indoor air quality problems can be prevented and existing problems remedied in a cost-effective manner through improved maintenance and design of building systems.

We believe S. 657 should explicitly guide Federal agencies toward placing the highest priority on research in the field of building systems technology.

No. 2, because of the extreme complexity in evaluating simultaneous exposures to mixtures of contaminants, we do not regard source-by-source or pollutant-by-pollutant risk assessment as a cost-effective approach toward improving indoor air quality in general. Such analyses should be undertaken only when the building systems approach has failed to ameliorate problems.

No. 3, we believe that research conducted in cooperation with the private sector should be given high priority. Such research will promote non-adversarial partnerships between industry and government, development and access to advanced technology, and credibility in private planning, implementation, analysis, and interpretation.

Turning now to the regulatory implications of the bill, the legislation requires EPA to do the following: list contaminants in indoor air, prepare health advisories for each contaminant noting the concentration at which there is no known or anticipated human health effect with an adequate margin of safety, and take action to reduce exposure to the listed contaminants to the no-effect level.

While we are aware that the sponsors of the bill intend that it not impose any new regulations, we are concerned that these three provisions taken together may have the effect of imposing new and substantial regulatory requirements on the business community. We urge the subcommittee to carefully evaluate the precise way in which these activities will work in practice in order to avoid unnecessary and burdensome regulations.

With regard to the health advisories, BCIA is sympathetic to the dilemma EPA faces. On the one hand, we understand the desire to communicate risk information to people who are actually at risk. On the other hand, it would be misleading to provide health advisories which bear no relationship to actual risks.

The complex and changing atmospheres in indoor environments do not lend themselves to the development of specific health advisories. Because of the impact health advisories are likely to have in the marketplace, BCIA believes that the bill should require that EPA meet a minimum standard of scientific support. At the moment, the bill does not require that there be an adequate level

of scientific evidence before advisories may be written and safe levels set for contaminants.

We believe that a poorly substantiated health advisory can have the same impact as regulatory action under section 6 of TOSCA or a pesticide cancellation under FIFRA.

Thank you very much for your time.

Senator LAUTENBERG. Thank you very much, Dr. Cammer.

Obviously, this is a panel perhaps unlike the one before you where there are some differences of view in case you noticed.

I was curious about something that Mr. Bisk said talking about the sick building syndrome. Is there such a thing in your view? Forget the name we have given this. Is there a condition that you can see where a particular building may have a unique problem that makes it at least less pleasant than other buildings, perhaps more uncomfortable than other buildings, or is a building a building a building in your view?

Mr. BISK. No, I would agree with you, Senator, that there are buildings, there are environments in the workplace which are obviously less comfortable than others. I would say to you that that is probably a result of many factors. This is not a—we should not seek short-term, nearsighted solutions to long-range problems.

Senator LAUTENBERG. I agree. I don't think anybody would argue for nearsighted solutions.

The thing that I just want to try to straighten out for my own edification and for the record is that you say that you could find a building that perhaps has a problem in which the people might be made to feel uncomfortable. So why does the nomenclature "sick building" bother you so much? You described that as a public relations panic. I don't want to misquote you, but it suggests that, "Where building-related indoor air problems exist, they are often sensationalized by misappropriated labels such as 'sick building syndrome.' "

What kind of a label could we give a building like that?

Mr. BISK. I would say that a building which exhibits a level of discomfort that can be resolved, that should be solved by——

Senator LAUTENBERG. Can we tell the people who might want to work there or who do work there—should we let somebody admit that there's a problem with that building or should we say, hey, let's keep it between you and me?

Mr. BISK. No, I think the problem should definitely be addressed, and this is what we're attempting to do through an educational process. I think many of the problems we have to identify with buildings.

In the mid-seventies we had a real energy crunch in this country—long lines at gas stations. We were all urged to conserve energy at any cost, almost literally. Many building owners—in fact, at that time many building owners shut down their outside air dampers to the point where they almost sealed them shut and recirculated air. We didn't really realize, in all honesty, the long-range effects that would have.

There is a direct—in my opinion, a direct—relationship between the infusion of fresh outside air and recirculating the existing stale air that makes a building at that time temporarily have a sick building syndrome. That does not mean that the building itself

should be called a sick building. That means that that problem should be addressed.

Senator LAUTENBERG. I have had a lot of experience with a building because the company that I ran before I got this job had lots of space. I was the one who primarily engineered the purchase and the design.

We have some 3 million square feet of space at my old company and we tried very much to keep a decent quality workplace because for us the critical thing was employee productivity. We wanted people to feel good about the time they spent at work. It didn't take the EPA report to tell me that people spend most of their time indoors. I knew that before this magnificent discovery.

The fact is that we knew that people had to feel good if they were going to be productive, have a decent environment and not miss a lot of days at work. I didn't know whether you were saying, look, let's not tell people——

Mr. BISK. Oh, no, absolutely not.

Senator LAUTENBERG [continuing]. That this place might have a problem, because to me we're a lot better off to say: "Look, there may be some problems in the building. We're working on it. We're doing the following things, but meanwhile maybe if you want to consult a doctor or someone to see what your condition is." At least indicate a cooperative view because some of the statements that you made—and we're now talking about the period during the gasoline or the oil crisis—most of the building in the country took place after that, as you very well know. We've had this incredible building surge in the last decade.

You also talked about "Public pronouncements about the presence of asbestos in buildings by Federal authorities led to requests for purchase discounts and efforts to decrease property values." I don't think that was the mission when people said, hey, there's asbestos in this building; watch out.

I can tell you this from direct and personal experience with people in my State, that we ought to pay attention wherever there is asbestos and make sure that there is no unusual exposure because it's a killer and there's just no doubt about that.

People aren't looking to diminish property values. That's not the mission.

I would have to tell you this—once, again, I hear what you say and I want to be objective about this. My first interest, I must tell you, is to protect human health. I come from the corporate world, the only one I think in this body who ever ran a major public corporation.

But when we talk about costs, we can't abandon the cost side of the equation, but if it's a member of your family or it's a friend or a neighbor who comes home with clothes infected with asbestos fibers that passes not only cancer to the individual, but also to the dependents, there is a point at which you have to say, "Okay, we have to take care of this." There certainly hasn't been any problem with the decline of property values. OSHA had more property investments in the last few years.

Again, I'm not trivializing what you say—either you, Dr. Cammer, respectfully acknowledge; you represent some very good companies—but we have to get on with determining whether or

not this is illusion, whether or not people are telling the truth when they say, "Look, I can't work there; it makes me sick. This building is a lousy place to work. Lots of my friends are sick."

Frankly, I believe just what you said. The intention of energy conservation has produced an environmental air quality that's an abomination. The tighter you make these buildings—look what's happening in airplanes.

I don't know whether you're aware of that, but air quality in airplanes is really foul. It stinks. Much of that is because the engines have become more efficient, less fuel consumption, and they're recirculating that air. So now we sit, 200 of us, in a tightly-packed salami and we're each breathing what the other guy's got. At least I was able to get smoking stopped in two-hour flights, and I'm on my way to getting it stopped on all domestic flights.

We know there are certain conditions that are created. We may have to do things that we don't like to do because we are in a condition where we can't revise every building and reestablish the ventilating conditions. Things that we thought were good turned out to be terrible. You heard the testimony of one person here, and I know the family, not personally, but I know a lot about them. This person is literally so allergenic to things, so sensitized to things that she can't move.

Dr. Cammer in his statement says that, "Ventilation will largely solve the indoor air pollution problem." Do you agree with that?

Mr. BISK. I agree with that wholeheartedly. I do not say that that is the only solution or that we should stop at that point, but, Senator, even with radon which is, we know, a very deadly gas, the first thing that was recommended to all people who have contaminated houses is to increase the ventilation three-, four-, fivefold, as much as possible, install attic fans, open the windows upstairs. Ventilation is the key. There's no question about it.

You spoke about new buildings built after 1974, 1975, 1976, when we had the energy crunch. Those buildings, the new building technology is to seal the building. They are now installing curtain walls without operable windows. The amount of recirculated air has become minimal. Just take in enough outside air to meet the local codes. That, I think, is one of our problems.

But if you read our position, Senator, we are not adversarial. We do agree with you 100 percent, there has to be communication, effective and responsive communication between building management and tenants, and we spell it out—on my copy it's on page 8, but you might have another copy with an earlier page.

Senator LAUTENBERG. Well, I hope we're dealing with the same copy.

Mr. BISK. We endorse that wholeheartedly.

Senator LAUTENBERG. How important do you think it is for EPA to address the sources of indoor pollutants as well as ventilation? You said ventilation is not the whole problem.

Mr. BISK. No, it is not. We recognize, the industry recognizes, as also can be found in the body of my testimony, that HVAC systems, tobacco smoke, carbon monoxide, ceiling tiles, wall paper, carpeting, furniture, flush toilets, humidifiers, pressed-wood products, insulation, and textiles are all sources of airborne contaminants. We know that.

Senator LAUTENBERG. And EPA ought to be looking at them?

Mr. BISK. Absolutely. EPA has a responsibility toward that end.

Senator LAUTENBERG. Dr. Cammer, there's general agreement that preventing pollution is the most economical, environmentally-sensitive way to address the problem of waste generation. Yet, you place almost total faith, if I read your comments correctly, in ventilation.

Isn't that approach inconsistent with the concept of pollution prevention?

Dr. CAMMER. I don't think it's inconsistent. I think you will always have people who are residents in homes or buildings who will be very sensitive to some chemical or another chemical. I'm not downplaying that. I think it's a serious problem and that it needs to be addressed.

I think if you replaced this chemical with another chemical, another substance, you will find a different group of people who may also be sensitive. That's one problem.

The other problem is truly understanding what is the cause if you have the sick building syndrome. It's very difficult to understand what is the cause and much easier to fix it. It's kind of a surprising thing.

Senator LAUTENBERG. Well, that's if you get it all fixed, but if you say, "Look, what are you worried about? We're going to improve the ventilation system here," and people continue to have ill effects, then, as I understand what you're saying is, "Look, well, then we'll fix another thing."

Isn't it worth it to find out what's there and whether or not problems are being created?

Dr. CAMMER. I think yes and no. I think, yes, there are some bad situations. There are bad substances. There are bad contaminants. The estimate of 5 to 20 thousand cancer cases per year from radon is a horrendous figure. There are other substances out there that really need to be looked at.

I think those are relatively few in number. I think that if you were to expend most of the Federal Government's resources in this area toward looking at source-by-source contaminants or pollutants, what you would do is you would end by having tables of this and information about that which don't really always bear a relationship to reality, and most of the money will be expended before you go toward really improving the indoor environment.

Senator LAUTENBERG. Looking more to the voluntary response, do you really think that can fix it?

Dr. CAMMER. I don't think that voluntary—I'm an ex-EPA person. I used to work at Waterside Mall for five years. I don't think that voluntary responses alone are going to solve anything, but I do think that responses such as——

Senator LAUTENBERG. Do you want to comment on the air quality at Waterside Mall?

Dr. CAMMER. I know that they're moving to a new building very soon and I expect that new building to be the epitome of clean indoor air.

Senator LAUTENBERG. That suggests that just maybe there was a problem with the air quality in the other place or is that just a space problem?

Dr. CAMMER. I don't think I should comment.

Senator LAUTENBERG. I read your lips.

Mr. Brobeck, we're about to conclude here. Is EPA disseminating useful information to consumers and employees about indoor air pollution, in your view?

Mr. BROBECK. I can't speak to the question of disseminating information to employees. They are certainly disseminating some information to consumers. We feel it is insufficient. That's why the provisions in your legislation that would provide for a clearinghouse of information not only to the health community and the building communities but also to consumers, are so important.

Senator LAUTENBERG. Should EPA develop a citizens' guide for indoor air pollution like it's done for radon?

Mr. BROBECK. Well, certainly they should. Perhaps the single most important information source to consumers, however, is a toll-free hotline that would cover a wide array of pollutants.

Senator LAUTENBERG. Mr. Bisk, if you could get a good measure of indoor air quality that you could look at and say, this building has got good air quality; this building has got bad air quality, would you recommend the use of something like that, like a radon test kit or something?

Mr. BISK. I would say that it is very important to establish a level at which indoor air is considered to be safe for human consumption. I think the whole problem with asbestos issue which still continues is that nobody is willing to say to the building owner or to the industry, "This level of air which is roughly equal to the ambient outside air levels of airborne asbestos, for example, is a level which is known to be safe for human beings, not that you will never die from respiratory infection, but you may have to live to be 1,000 before you do."

I think at some point we need to establish the criteria, what is a safe level?

Senator LAUTENBERG. I wish that we could spend a couple more minutes together. I thank you all for your testimony.

Thank you all very much.

[Whereupon, at 12:10 p.m., the subcommittee recessed, to reconvene at the call of the Chair.]

[Statement submitted for the record and the bill S. 657 follow:]

STATEMENT OF
ERICH BRETTHAUER
ACTING ASSISTANT ADMINISTRATOR
OFFICE OF RESEARCH AND DEVELOPMENT
of the
U.S. ENVIRONMENTAL PROTECTION AGENCY

BEFORE THE

SUBCOMMITTEE ON SUPERFUND,
OCEAN, AND WATER PROTECTION

ENVIRONMENT AND PUBLIC WORKS COMMITTEE

U.S. SENATE

MAY 3, 1989

Mr. Chairman and members of the Subcommittee, my name is Erich Bretthauer, and I am the Acting Assistant Administrator for Research and Development at EPA. It is a pleasure to provide testimony this morning on the problem of indoor air quality. As you know, EPA's Office of Research and Development plays an important role in carrying out the Agency's research responsibilities under Title IV of the Superfund Amendments and Reauthorization Act.

In previous testimony on indoor air quality legislation, EPA indicated that it could not endorse any legislation pending completion of a comprehensive report to Congress mandated under Section 403(e) of SARA which would analyze a number of issues relevant to the determination of long range Federal policy on indoor air quality. While the Agency's work on this report is largely complete, the policy recommendations contained in the report have not yet been fully reviewed by the current Administration. Similarly, because the Administration is still reviewing S. 657, we do not yet have a position on the bill which I can communicate to the Subcommittee at this time. Nevertheless, I would like to briefly summarize for you the Agency's indoor

air activities and the progress we have made to date in implementing Title IV of SARA.

In 1983, when the Interagency Committee on Indoor Air Quality -- or CIAQ -- was formed, EPA's research program formalized its exchange of information with a number of other Federal agencies with an interest in indoor air quality. At that time, EPA's Total Exposure Assessment Methodology -- or TEAM -- studies began to document what many had suspected for some time: that for many pollutants, indoor concentrations often exceeded ambient, or outdoor levels. Coupled with the high percentage of time most people spend indoors, indoor pollutant exposures represent a significant portion of the public's health risk from air pollution. In 1984, although no explicit legislative authority for EPA's indoor air activities existed, Congress began appropriating about $2 million a year for EPA to conduct research into indoor air quality problems.

By October 1986, when Title IV of the Superfund Amendments and Reauthorization Act (SARA) was signed into law, a number of significant program initiatives were underway to address specific pollutants which had been identified as posing substantial long term risks to segments of the U.S. population.

The Asbestos Technical Assistance Program, initiated in 1979, was merged into the Asbestos Action Program after the Asbestos School Hazard Abatement Act (ASHAA) was passed in 1985 and is responsible for reducing indoor exposure to asbestos. This program provides a wide range of technical assistance services to States, building owners and managers, asbestos abatement contractors, and the public. Due in part to EPA's efforts, at least 39 States have some type of contractor certification programs in effect and we have provided more than $3.6 million in grants to States for such programs since 1985. We have also been actively working with several Federal agencies,

including GSA and the Veterans Administration, to develop responsible asbestos management and abatement programs. In addition, the Agency's asbestos program administers the school loan and grant program under ASHAA and has established a comprehensive framework of regulatory standards for managing asbestos in schools under the Asbestos Hazards Emergency Response Act (AHERA). More recently, EPA submitted its Report to Congress on Asbestos-Containing Materials in Public and Commercial Buildings.

The Agency's Radon Action Program is another major program aimed at reducing human health risks resulting from indoor exposure to a naturally occurring environmental pollutant. In contrast to the asbestos program, which relies to a large extent on a large grant component and a regulatory strategy, our radon program is largely non-regulatory in nature. In 1988, Congress passed the Indoor Radon Abatement Act which further enhanced the Agency's radon program. Comprised of four complementary elements -- problem assessment, mitigation and prevention, capability development, and public information -- the radon program has made significant progress in a relatively short time frame of alerting the public to both the potential risks of radon exposure as well as the options for testing and mitigation where elevated levels of radon are found. Within the last two weeks, we announced the results of a 16 State survey of radon in schools and have recommended that schools nationwide be tested for radon. This announcement follows last year's recommendation by EPA that homes be tested for radon. I am pleased to report that in part due to this effort, more than 1 million homes have been tested in the past six months.

At the same time, a number of indoor air related activities have been underway in other offices throughout the Agency. The Toxic Substances Control Act (TSCA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA),

and the Safe Drinking Water Act (SDWA) all provide the Agency with useful tools for addressing aspects of indoor air contamination. Under TSCA, we are actively addressing consumer exposure to solvents as part of a major integrated workgroup on chlorinated solvents in which other Federal agencies as well as affected industries are participating. Under FIFRA, banning the use of lindane as an indoor fumigant and the recent voluntary cancellation of chlordane for use as a termiticide are both good examples of our ability to control individual chemicals that pose unreasonable risks to health through indoor exposures. Under the SDWA, EPA has regulated volatile organic compounds that might contribute to indoor air pollution and expects to propose regulations for radon in drinking water in the Summer of 1990.

Despite the tools that are currently available to us to address aspects of the indoor air problem, EPA began to recognize in 1986 that a chemical by chemical approach to indoor air pollution problems was not going to be sufficient to solve the problem. At that time, the Agency was beginning to see a significant increase in occupant complaints in many modern office buildings, many of which were associated with inadequate ventilation. In addition, we began to see data indicating that major classes of indoor air pollutants -- including biological contaminants, environmental tobacco smoke, and low levels of volatile organic compounds -- were not being addressed from a programmatic standpoint. As a result, in 1986 we created an indoor air staff whose functions are to provide a policy framework for the indoor air research program, begin to develop an EPA indoor air quality policy, to disseminate information to a broad spectrum of audiences in need of information on indoor air quality, and to coordinate the many indoor air activities underway at EPA with on-going activities in Federal, State and local governments and in the private sector.

In June 1987, EPA submitted its Indoor Air Quality Implementation Plan to Congress. Among other things, this plan outlined our overall strategy for addressing indoor air quality problems. The first element of this strategy is to begin, through an active research program, to fill the many gaps in our knowledge about the exposures and health effects resulting from indoor air pollutants and ways to reduce risks to human health. The second element of the strategy is to continue to vigorously exercise our existing regulatory authorities under TSCA, FIFRA, the Safe Drinking Water Act (SDWA) and other appropriate legislative tools. Finally, we will continue to utilize non-regulatory programs as appropriate to address indoor air quality problems. As we have learned from the radon effort, non-regulatory programs are sometimes the most effective approach to solving indoor air quality problems. These activities include building effective partnerships with other Federal agencies, the States, local governments, and the private sector and disseminating information on indoor air risks and risk reduction strategies. EPA is actively implementing this strategy.

EPA's indoor air research program, with which I am more familiar, has made significant contributions to our understanding of indoor air exposures and methods to reduce those exposures. This program emphasizes four research areas: (1) source characterization and mitigation; (2) monitoring; (3) health effects; and (4) exposure assessment and risk characterization.

For example, EPA research devoted to source characterization and mitigation includes using small test chambers to develop protocols for quantifying the emissions from different building materials and studying the effectiveness of different mitigation approaches. This research is complemented by studies in a research test house which provide real-time, large scale results which can be compared to those from the chamber studies

and indoor air quality modeling. Our monitoring research includes compiling a compendium of indoor air quality measurement methods and using these methods to measure indoor pollutants in buildings. For example, EPA researchers recently reported on their measurement of indoor air quality in ten public buildings. This research confirmed that indoor levels of many pollutants often exceed those outdoors. EPA health effects research is studying short term health effects associated with exposures to mixtures of chemicals. Our exposure assessment and risk characterization research has produced an indoor air information assessment which was submitted to Congress as part of EPA's Indoor Air Quality Implementation Plan.

EPA researchers, along with those from the National Institute of Occupational Safety and Health (NIOSH), the Department of Energy (DOE), and Yale University, have recently completed the first phase of a study of the Library of Congress and EPA's headquarters facilities in an effort to uncover sources of complaints in those buildings. These studies have included developing and administering an occupant health and comfort survey, and performing measurements of indoor pollutant levels and ventilation rates.

In addition, an example of EPA's continuing research into the issue of indoor residential pesticide exposure is the current Non-Occupational Pesticide Exposure Study (NOPES), a cooperative effort between my office and the Office of Pesticide Programs. This study has included measuring personal exposures and both indoor and outdoor concentrations of 32 common household pesticides.

As you can see, the EPA indoor air quality research program is a very active one, which continues to provide useful results to assist the EPA program offices, the States, the private sector, and the general public.

In addition to the already developed asbestos, radon, and chemical control programs under TSCA and FIFRA, the major thrust of our Office of Air and Radiation's indoor air program is to focus on indoor air quality information dissemination, coordination, and policy development.

A major priority has been to begin to disseminate the information we have developed on indoor air quality through our research program and other sources. EPA recently published a booklet for the general public on indoor air quality which is being widely distributed through the Consumer Information Center, States, and the private sector. The booklet, titled The Inside Story: A Guide to Indoor Air Quality, was jointly produced with the Consumer Product Safety Commission and we think it will have a substantial impact in educating consumers to both the potential risks of indoor air pollution and more importantly, practical steps individuals can take to reduce those risks. We have also recently completed a comprehensive directory of State agency contacts on 16 different indoor air quality issues. This directory, which was developed by the Public Health Foundation as part of a cooperative agreement with EPA, provides the public with sources of assistance, no matter what agency of State government has the responsibility for managing that issue.

While I'm touching on the coordination aspect, I'd like to discuss what I think are major improvements in the operation of the Interagency Committee on Indoor Air Quality (CIAQ). In the last year, the CIAQ has completed a reevaluation and restructuring designed to improve the coordination of Federal indoor air quality programs. We prepared and widely distributed a detailed guide to current Federal indoor air quality activities, including a brief description, status, and contact point for the more than 500 different indoor air projects now underway. The quarterly meetings of the CIAQ are also more substantive then in the past, incorporating speakers and presentations on key

technical and policy issues of interest to Federal indoor air quality representatives. Nevertheless, it is clear that interagency coordination must continue to improve in order to minimize duplication of effort and to make maximum use of the expertise and authorities of the Federal agencies with indoor air expertise and jurisdiction.

Despite the progress we are making in addressing indoor air quality problems, we recognize that more work is needed to adequately characterize indoor air quality and develop appropriate EPA policy. As a result, the Agency is increasing the level of effort being applied to indoor air issues. The budget for the indoor air program office is being increased fourfold in FY 90 to expand its capabilities to conduct analyses and disseminate information. In addition, the indoor air research program is beginning to refocus its research priorities and I anticipate increasing the level of indoor air research in FY 91.

In summary, we believe that EPA is making significant progress in the development of an effective response to the growing problem of indoor air pollution and anticipate working closely with the Subcommittee as its work continues. That completes my prepared statement, Mr. Chairman. I would be pleased to answer any questions the Subcommittee may have.

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STATEMENT OF

MARY LAMIELLE, DIRECTOR
NATIONAL CENTER FOR ENVIRONMENTAL HEALTH STRATEGIES

BEFORE THE

SUBCOMMITTEE ON SUPERFUND, OCEAN, AND WATER PROTECTION
U.S. SENATE
WASHINGTON, D.C.

MAY 3, 1989

Mr. Chairman and distinguished members of the Committee. My name is Charles Lamielle. I am here representing my wife, Mary Lamielle, Director of the National Center for Environmental Health Strategies. Mary is unable to be here today because she is one of the tens of thousands of individuals who must restrict daily activities including attendance at public meetings such as this one because of severe reactions to chemicals typically found in indoor environments. I am accompanied by Linda Barran, a local board member who is a victim of indoor pollutants at the workplace.

The National Center for Environmental Health Strategies is a New Jersey-based organization that provides informational, educational, and advocacy services for the public on chemical and environmental issues and policies and on illnesses caused or exacerbated by chemical and environmental pollutants. We are here today to bring to your attention the needs of those who suffer from chemical sensitivity disorders.

The task before this Committee--to establish a comprehensive indoor air quality program at the U.S. Environmental Protection Agency--is an urgent one. Indoor pollutants pose a significant public health hazard to all Americans. Action is needed to safeguard the entire population.

We strongly endorse and support Senate Bill 657, the Indoor Air Quality Act of 1989.

Our government is devoting tremendous resources in maintaining healthful outdoor air. This is very important. However, since Americans spend 90% of their day indoors, and since some populations including the very young, the elderly, and the chronically ill spend 100% of their day indoors, government agencies must devote commensurate attention to problems of indoor air. Our society has always recognized the sanctity of the home. Yet we know more about outdoor pollutants than those under our own roof. And what we do know of these should galvanize us into action!

Scientific studies by government, industry, and university researchers have established that indoor air is contaminated by many substances. Bacteria, fungi, and dust particles may be present in ventilation ducts and air conditioning systems. These pollutants may include legionella and aspergillus bacteria, both implicated in the development of serious respiratory illnesses.

Even more insidious is the witch's brew of gaseous pollutants which harbor in our homes and buildings. With over 60,000 chemicals in daily use in the U.S. today and hundreds of new ones introduced each year, the intensity of these contaminants is an ever-growing problem. These chemicals, for the most part, have not been tested for their individual, cumulative, or synergistic effects. Meanwhile, scientists at the Congressional Office of Technology Assessment have indicated that there is "increasing evidence that many chemicals have neurotoxic effects." According to NIOSH most solvents in everyday use have never been tested for neurotoxic or neurobehavioral effects. The National Center for Environmental Health Strategies (NCEHS) has proposed that the Program Requirements in the Indoor Air Quality Act of 1989 be amended to require such testing. See Attachment A, #2.

EPA's landmark TOTAL EXPOSURE ASSESSMENT METHODOLOGY (TEAM) STUDY found our homes two to five times more polluted than the air outdoors regarding specific volatile organic compounds (VOC's) Even in New Jersey, in tests conducted in homes along the chemical corridor, and even with the adjusted levels of outdoor air toxics which were recently released, the indoor air contributes the major burden for an individual's daily chemical exposure.

Polluted indoor environments have been implicated in a number of specific illnesses. The TEAM study identified two chronic health effects from the collage of irritants, sensitizers, and toxics in the typical home environment: cancer and chemical sensitivity; and one acute health effect: sick building syndrome. Meanwhile the Board on Environmental Studies and Toxicology of the National Research

Council, the research arm of the National Academy of Sciences, estimates "approximately 15 percent of the U.S. population have an increased allergic sensitivity to chemicals commonly found in household products, such as detergents, solvents, pesticides, metals and rubber, thus placing them at increased risk to disease." THE INSIDE STORY jointly published by EPA and the U.S. Consumer Product Safety Commission notes that those with chemical sensitivity from chemical pollutants or formaldehyde "may react to even trace amounts of chemicals to which they have become 'sensitized'." Dr. Mark R. Cullen of the Yale University School of Medicine indicates that "indoor air pollution rivals organic solvents as the most common precipitant" of multiple chemical sensitivities.

While EPA has limited research under way to evaluate indoor pollutants, none of these projects focuses on chemical sensitivity disorders. There are no policies to control the mix of toxic and sensitizing substances present in the typical indoor area. There are no educational programs to avert potential casualties. There are few answers for those damaged by indoor pollutants.

It is therefore critical that research, guidelines, educational activities, and health advisories for indoor environments be developed and that these initiatives address the most susceptible populations, the most vulnerable. Indoor air quality must be maintained at the highest quality for those at greatest risk. The National Center for Environmental Health Strategies has proposed several amendments to the Indoor Air Quality Act of 1989 which address the needs of "populations at increased risk of illness" and those with chemical sensitivity disorders whose illness is frequently caused by indoor pollutants and invariably exacerbated by them. See Attachment A, #1-4; 6-8.

Tens of thousands of individuals are so debilitated by chemical sensitivity disorders that they have had to make major lifestyle

changes to cope with the illness. These are just the tip of the iceberg. There are hundreds of thousands more--**the walking wounded**--people trudging along, trying to get by from day to day, having great difficulty at work, at home, or during other activities. Many are unaware that their chronic complaints are either caused or exacerbated by their own surroundings.

From classrooms in North Dakota to metropolitan hospitals, from Fortune 500 companies to EPA Headquarters, and in private residences across America, people are becoming ill from the complex array of chemicals in building materials, furnishings, and consumer products. Some people with chemical sensitivity disorders become ill from a specific contaminant in the indoor environment--from particle board, or new carpeting and adhesives, or home insulation, or termite treatments. Many others have chronic exposures, a slow and subtle poisoning. Regardless of the triggering contaminant(s), known or unknown, most indoor environments are a nightmare for those who have chemical sensitivity disorders.

Individuals with this illness suffer from a wide range of mild to life-threatening symptoms from everyday chemical exposures. Plastics, particle board, adhesives, carpeting, dry cleaning chemicals, paint, varnish, natural gas, detergents, cleaning products, moth balls, room deodorizers, pesticides, tobacco smoke, fragrances and fragranced items are some of the many indoor items which can cause debilitating reactions.

Symptoms from chemical sensitivity disorders include multiple complaints such as fatigue, confusion, memory loss, headache, migraine, seizures, and other neurological difficulties; respiratory involvement with bronchitis, asthma, and shortness of breath; and muscle and joint pain and weakness. Gastrointestinal problems such as food intolerances, nausea, and indigestion; hives, rashes, eczema and flushing; and cardiovascular complaints such as vasculitis, hypertension, and irregular or rapid pulse are also common. Many individuals have allergic

rhinitis, sinusitis, dizziness, vertigo, and visual disturbances.

The current levels of pollutants in typical indoor environments explain in part the difficulty that those with chemical sensitivity disorders have in accessing public buildings and the difficulty many have in coping with contaminants in their own home. Many chemical victims must use activated charcoal filters or masks, respirators, or oxygen to minimize exposure to indoor contaminants.

Indoor pollutants have produced a population of **ENVIRONMENTAL REFUGEES**--some living as though under house arrest, their homes stripped of many furnishings and consumer products; others living nomadic lifestyles, a few in specially built trailers, but most in stripped down mobile homes, or in old cars, or vans, or tents, or sheds--isolated from interaction with society and unable to earn a living or obtain many of the basic necessities of life. Some have gravitated into communities. Some are among the nation's homeless.

Chemically sensitive people come from all walks of life: from laborers to professionals. The ranks of the chemically sensitive include professionals in areas such as medicine, law, architecture, journalism, academia, and government, and their spouses and children. Even indoor air pollution specialists have succumbed to this devastating illness.

The ever-increasing numbers of chemically sensitive include:

* A high school senior from North Dakota who has had to finish school on a homebound program after developing multiple chemical sensitivities following exposure to newly installed carpeting in the school building.

* A twenty-nine year old Washington, D.C. office worker who has developed severe respiratory problems, dizziness,

and multiple chemical sensitivities from working in an enclosed, newly renovated office building with 100% recycled air.

* A woman in North Philadelphia, confined to one room in her home, unable to tolerate newsprint or socialize, experiences endless reactions to particle board and other contaminants. She has no financial resources or other options to try to remedy her situation.

* A gentleman from Michigan has developed multiple chemical sensitivities from chronic exposure to vapors off-gassing from a waterproofing compound applied to the basement wall.

* A former Harvard Law School student who was poisoned by exposure to a common household pesticide has lived in a tent along the banks of the Blanco River in Texas to avoid indoor contaminants.

* A chemical company executive and his family moved into a new home in New Hampshire. After his wife developed severe symptoms, they found the home was contaminated with pentachlorophenol, chlordane, and formaldehyde.

* A bus driver in California has developed multiple chemical sensitivities following repeated exposure to deodorizers and pesticides sprayed into his vehicle's ventilation system.

Three of the largest support organizations which provide services for the chemically sensitive are the Human Ecology Action League, Chicago, Illinois; the National Foundation for the Chemically Hypersensitive, Wrightsville Beach, North Carolina; and Share, Care and Prayer, Arcadia, California. Their combined

membership is near 10,000. Over one hundred local support groups dot the country. Many of these groups have hundreds of local members. A recent letter to "Dear Abby" which featured the Human Ecology Action League brought in over 3,000 information requests in the first two weeks after publication. [I also serve on the Board of Directors of the Human Ecology Action League.]

The four major publications which address the issues of those with chemical sensitivity disorders are: THE DELICATE BALANCE edited by Mary Lamielle; the ECOLOGICAL ILLNESS LAW REPORT edited by Earon Davis; THE HUMAN ECOLOGIST published by the Human Ecology Action League; and THE REACTOR, edited by Susan Molloy. Subscribers to these publications include hundreds of professionals in the areas of medicine, science, law, major medical centers, academia, and government.

The public, just like those with chemical sensitivity disorders, is hungry for information on indoor pollution. THE HOME BOOK published by the Center for Study of Responsive Law calls the movement against indoor air pollution the "fastest grass roots environmental drive in the country." Many of the calls to the National Center for Environmental Health Strategies , as with other organizations which address the needs of the chemically sensitive, concern availability of "safe," non-toxic consumer products. The vast number of newsletters, magazines, and books on this topic reflect the growing public concern. Indeed, numerous mail order firms and cottage industries have sprung up to meet the demand for less toxic items. The numbers of manufacturers of air cleaners and the increased availability of firms which provide testing for contaminants in private residences are also testimony to the urgency of this issue. Presumably research and educational activities mandated by the Indoor Air Quality Act of 1989 would begin to provide the public with useful information in a timely manner on potentially hazardous items as well as strategies to help minimize indoor pollutants.

The absence of reliable data which is readily available is doubtless an impact on the diagnosis and treatment of environmentally-

induced illnesses. The ROLE OF THE PRIMARY CARE PHYSICIAN IN OCCUPATIONAL AND ENVIRONMENTAL MEDICINE, a recent publication of the National Academy of Sciences, Institute of Medicine, indicates that "information on toxic substances and their effects is available from a number of government agencies, but the sources are a confusing array not well organized for easy access by the average physician." Without adequate information on the potential health effects from indoor pollutants, many chronic health conditions, including chemical sensitivity disorders, go undetected.

The National Center for Environmental Health Strategies strongly recommends that a provision be added to the Indoor Air Quality Act of 1989 to require a REPORT ON THE IMPACT OF INDOOR POLLUTANTS ON CHEMICAL SENSITIVITY DISORDERS. This report must address the state of the art information regarding the nature, severity, and incidence of this illness. [As indicated in Attachment A, the specific language will be forwarded under separate cover.]

Governmental agencies have known about the populations of those with chemical sensitivity disorders for years. Federal and state agencies have failed to provide these individuals with adequate protection from either outdoor or indoor pollutants.

In the past EPA has had no mandate to address this issue. In a January 7, 1988 response to Earon Davis, editor of the ECOLOGICAL ILLNESS LAW REPORT, Ms. Eileen Claussen, Director of EPA's Office of Program Development, indicated that the agency's failure to focus on chemical sensitivity disorders was due in part to the "relative newness" and the "very large dimensions of the problem" and to the "lack of legislation to deal with 'ecological illness' [chemical sensitivity disorders] as a single problem." The Indoor Air Quality Act of 1989 presents an opportunity to act on this issue.

Governmental agencies and a public health organization are among those who have indicated the dramatic need for research efforts into chemical sensitivity disorders. In 1986, the Ministry of Health for the province of Ontario, Canada, became the first governmental entity to recommend research activities into this illness. The Minister of Health noted that "there may be debate as to the nature of the illness from which these people are suffering, but there is no doubt that they suffer disabilities. These studies may clarify the causes of their complaints and lead to more effective management." In the United States, the Board on Environmental Studies and Toxicology advised the National Research Council "to undertake a study to evaluate the scientific evidence" regarding individual hypersusceptibilities to indoor pollutants. Meanwhile, the American Public Health Association (APHA) has created a task force to examine the problem. This follows successful roundtable discussions held by the APHA Occupational Health and Safety group at the annual meeting in November 1988.

In March 1989 the Maryland Department of the Environment released a report entitled the CHEMICAL HYPERSENSITIVITY SYNDROME STUDY which was mandated by Maryland Senate Joint Resolution 32. In a cover letter to Maryland Governor Schaefer, Martin W. Walsh, Jr., director of the Maryland Department of the Environment, stated that "CHS [chemical hypersensitivity syndrome] is decidedly a problem of national scope and the primary effort must be directed by the medical community at the national level. At the federal level, MDE [Maryland Department of the Environment] has been unable to identify any specific program or federal funds targeted for CHS research. EPA officials have expressed some interest should their budgets increase. Generally speaking, there are no funds available to MDE for the type of base-level research necessary...CHS will be incorporated, as applicable into the Department's Indoor Air Program and will be evaluated to a degree proportionate to the overall indoor air problem." The study's author, Rebecca Bascom, M.D., M.P.H. of the University of Maryland indicates that "there is currently widespread interest in understanding

the indoor environment and health risks that may result from exposures therein. Some people believe that sufficient evidence exists to link CHS with point source exposures indoors and to mandate their reduction in the indoor environment. Others believe that indoor exposures and their health effects should be a high priority for research, but that information is insufficient to mandate action."

A mandate is required to study "chemical sensitivity disorders" as well as "sick building syndrome." Without such a legislative requirement, it is unlikely that the types of sophisticated research needed in these areas would be performed. Furthermore, some individuals who experience "SBS" complaints will indeed develop chemical sensitivity disorders including multiple chemical sensitivities. Unless this interrelationship is clearly identified, some studies may fizzle before they address more complex sensitivities.

Indoor air pollution is a significant health threat. Action is needed. Those with chemical sensitivity disorders suffer daily from polluted indoor air. We support and endorse the Indoor Air Quality Act of 1989. All Americans will benefit from its provisions. We strongly urge adoption of the amendments which we have proposed. We particluarly need research requirements to determine the interrelationship between this debilitating illness and indoor pollutants so that we can protect its victims and avert further casualties.

We thank you for the opportunity to present this testimony. We would be pleased to provide any additional information you may require.

ATTACHMENT A: PROPOSED AMENDMENTS

We propose that SECTION 4, DEFINITIONS include the term "populations at increased risk of illness" which is used on PAGE 10, SECTION 5, SUBSECTION (b) PROGRAM REQUIREMENTS., ITEM (3), LINES 13-14.

1. PAGE 6, SECTION 4. DEFINITIONS.
   ADD NEW SUBSECTION (4); RENUMBER (4)-(9) TO READ (5)-(10):

   (4) "populations at increased risk of illness" include those who may experience different symptoms or more severe symptoms than the general population due to factors such as age, gender, genetic makeup, nutritional status, licit or illicit drugs, and other lifestyle factors and those with preexisting conditions such as asthma, allergies, chronic bronchitis, emphysema, and other lung diseases, heart disease, vascular problems, immunological disorders, neurological impairments, chemical sensitivity, multiple chemical sensitivities, and sensitivities of unknown etiology as well as additional outdoor and workplace exposures.

We propose the following amendments (2-4) to address aspects of the research needs of high risk populations.

2. PAGE 10, SECTION 5, SUBSECTION (b) PROGRAM REQUIREMENTS., ITEM (1), LINE 7
   ADD THE UNDERLINED TO LINE 7:

   natural or anthropogenic <u>including additive, cumulative, and synergistic effects on both healthy individuals and populations at increased risk of illness</u>...

3. PAGE 11, SECTION 5, SUBSECTION (b) PROGRAM REQUIREMENTS.
   ADD NEW ITEM (7); RENUMBER (7)-(19) TO READ (8)-(20):

   (7) development of methods and techniques to indicate how industry responds to populations at increased risk of illness or disabled by indoor pollutants;

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ATTACHMENT A: PROPOSED AMENDMENTS

4. PAGE 11, SECTION 5, SUBSECTION (b) PROGRAM REQUIREMENTS., ITEM (8), LINE 16
ADD THE UNDERLINED TO ITEM (8), LINE 16

(8) contaminant concentration levels in the indoor air, <u>and the most effective way for populations at increased risk of illness to avoid health effects</u>;

We propose that "adverse" be removed from the definition of (3) "indoor air contaminant" in SECTION 4. There is presently insufficient information on health effects from pollutants to know which may eventually be found to be adverse.

5. PAGE 6, SECTION 4, DEFINITIONS., ITEM (3), LINES 15-16
DELETE "ADVERSE"; CHANGE TO READ AS FOLLOWS:

ably be anticipated to have an effect on human health;

We propose three additions (6)-(8) to the NATIONAL INDOOR AIR QUALITY RESPONSE PLAN to ensure that provisions are made for those with multiple chemical sensitivities and other "populations at increased risk of illness."

6. PAGE 28, SECTION 7, SUBSECTION (a) AUTHORITY., ITEM (2), LINE 10
ADD THE UNDERLINED TO LINE 10:

of a range of response actions <u>directed to a range of affected individuals</u> which will result in...

ATTACHMENT A: PROPOSED AMENDMENTS

7. PAGE 28, SECTION 7, SUBSECTION (a) AUTHORITY., ITEM (2), LINE 15
ADD THE FOLLOWING SENTENCE AT THE END OF LINE 15:

There must also be a provision for individuals for whom a healthful indoor environment cannot be attained.

8. PAGE 29, SECTION 7, SUBSECTION (c) SUPPORTING ACTIONS., LINE 20
ADD THE UNDERLINED TO LINE 20:

exposure to contaminants **for the healthy population and those with multiple chemical sensitivities** including--

We propose inclusion of a new SECTION 14. **REPORT ON IMPACT OF INDOOR POLLUTANTS ON MCS** to address state of the art information regarding the nature, severity, and incidence of the illness which renders heightened susceptibilities to indoor contaminants.
The proposed language will be mailed under separate cover.

SPECIAL NOTE: Although we have used the term "multiple chemical sensitivities (MCS)" in the proposed amendments, our preference would be to substitute the more encompassing term, "chemical sensitivity disorders (CSD)" in lieu of "multiple chemical chemical sensitivities" throughout the bill and in the amendments presented herein.

ATTACHMENT A: PROPOSED AMENDMENTS

We propose inclusion of a new SECTION. **REPORT ON CHEMICAL SENSITIVITY DISORDERS.**

We propose that EPA prepare a report to Congress to review the following aspects of chemical sensitivity disorders, including multiple chemical sensitivities, as a health effect of chemical exposure, both in terms of what may cause the underlying sensitivity disorders and what may cause or trigger symptoms in individuals who have these disorders:

1. Epidemiologic data and other information regarding the prevalence, severity, and etiology of these types of illnesses.

2. Medical and scientific data pertinent to the etiology, presence of markers, biochemical mechanisms, and other scientific and quasi scientific data on these illnesses.

3. A complete survey and assessment of the policies of all Federal agencies, including the military, regarding chemical sensitivity disorders, whether in written policy statements, patterns in administrative decisions, or in practice.

4. Past, current, and planned research and other studies at the Federal, State, Local, and international levels on these illnesses.

5. Availability and usefulness of whatever methods of treatment, avoidance, or coping with these illnesses may exist.

6. A thorough explanation and consideration of the economic, social, psychological, housing, employment, legal, and other needs of people with various chemical sensitivity disorders, including multiple chemical sensitivities, whether of known or unknown etiology, including but not limited to the following:

a. How the medical community is responding to people who claim to have these illnesses.
b. Social and psychological ramifications of these illnesses.
c. Economic impacts of these illnesses upon those suffering from them as well as upon employers, family members, parents, and society in general.
d. How the various government and non-government entitlement, insurance, and other compensation systems [including Federal and other disability retirement programs, State and Federal workers compensation systems, etc.] are dealing with these illnesses.
e. How people with these illnesses are faring in the legal systems, including personal injury, toxic tort, and products liability litigation.
f. How people with these illnesses are faring in terms of securing reasonable accommodations in housing, workplace, and other settings.

g. How people with these illnesses are faring in requests for supportive and rehabilitative services.

7. A detailed statement of the research needs in this area and a plan for the implementation of those specific research proposals, both within EPA and in other agencies.

8. Detailed recommendations on what various Federal and State agencies can and should do to better meet the various needs of people with chemical sensitivity disorders, both in terms of prevention of these illnesses, proper early identification of those with the illness or those with high risk factors, and in the provision of medical and non-medical services to those already with the illness.

9. A detailed evaluation of the legal, economic (both costs and benefits), and ethical implications of chemical sensitivity disorders for all current Federal regulatory systems and standards pertaining to chemicals, focusing on whether and how these regulatory systems can protect people with multiple chemical sensitivities. Systems and standards to be considered include, but are not limited to, all those involving the full range of outdoor environmental protection of the air, water, toxics, hazardous waste, etc., in addition to occupational, product, transportation, housing, food and drug, and military standards.

For additional discussion of chemical sensitivity disorders and the proposed amendments, please review the testimony of Earon S. Davis, J.D., M.P.H.

The testimony of the National Center for Environmental Health Strategies is endorsed by Earon S. Davis, Editor, ECOLOGICAL ILLNESS LAW REPORT; the Human Ecology Action League, Inc.; the National Foundation for the Chemically Hypersensitive, Inc.; THE REACTOR, editor Susan Molloy; and Share, Care and Prayer, Inc.

E). The reason for "guessing wrong" about the high exposures may be that the importance of indoor sources was not well understood when the study was designed, and such potential sources were therefore not used to stratify the sample.

Health Effects

Although this study is concerned only with documenting exposures and identifying possible sources, some discussion of health effects may be appropriate, since these are the ultimate reasons for our interest in these compounds. Two broad types of health effects may be distinguished: chronic and acute.

Chronic Effects. The chronic effect of greatest interest is cancer. One of the TEAM target compounds (benzene) is generally considered a known human carcinogen. Five others are considered animal carcinogens and therefore possible human carcinogens—carbon tetrachloride, chloroform, trichloroethylene, tetrachloroethylene, and *p*-dichlorobenzene. Risk assessments of human exposure to these six compounds have been made using the TEAM exposure measurements and potency estimates from EPA and other organizations, with an estimated range of 1000-5000 excess cancer cases per year nationwide (22). These numbers far exceed the estimates of 5-27 cases per year that have been used to regulate hazardous air pollutants (NESHAPS).

Other TEAM target compounds are mutagens and therefore possible carcinogens. These include styrene, 1,1,1-trichloroethane, and α-pinene. Still others are promoters (co-carcinogens)—octane, decane, and undecane. Others are presently being tested for carcinogenicity (xylenes, ethylbenzene). Risk assessments of these chemicals are at present highly speculative; however, it is possible that their effects on cancer incidence are not negligible (23).

A second chronic effect of interest is chemical sensitivity. This is an ill-defined condition marked by progressively more debilitating severe reactions to various consumer products such as perfumes, soaps, tobacco smoke, plastics, etc. The incidence of this syndrome is unknown; however, anecdotal accounts indicate that it may be increasing sharply. The effects on productivity of affected persons can be severe.

Acute Effects. A second ill-defined group of symptoms, sometimes known as "Sick Building Syndrome," affects a number of office workers. The symptoms include sleepiness, nausea, eye irritation, irritability, forgetfulness, and a number of other respiratory and central nervous system disorders. One experiment has determined that the symptoms are unlikely to be related to mass psychology or otherwise psychosomatic (24). A second experiment has shown that mixtures of common organic pollutants (mostly xylenes) at levels similar to those in new buildings can cause both subjective and objective symptoms in a group of sensitive individuals (25). The lowest experimental concentration was 5 mg/m^3; effects were still apparent, leading the experimenter to hypothesize that effects may appear at levels as low as 1 mg/m^3. Thus, the indoor air levels measured in the TEAM Study, which exceeded 1 mg/m^3(sum of 11 organics) in ~3% of New Jersey homes, may have some potential of being associated with frank acute health effects, although no attempt was made to observe such effects.

Standard Operating Procedures

To make the methods developed in the TEAM Study more widely available, detailed descriptions of all procedures have been compiled. These Standard

Worklife

A PUBLICATION ON EMPLOYMENT AND PEOPLE WITH DISABILITIES

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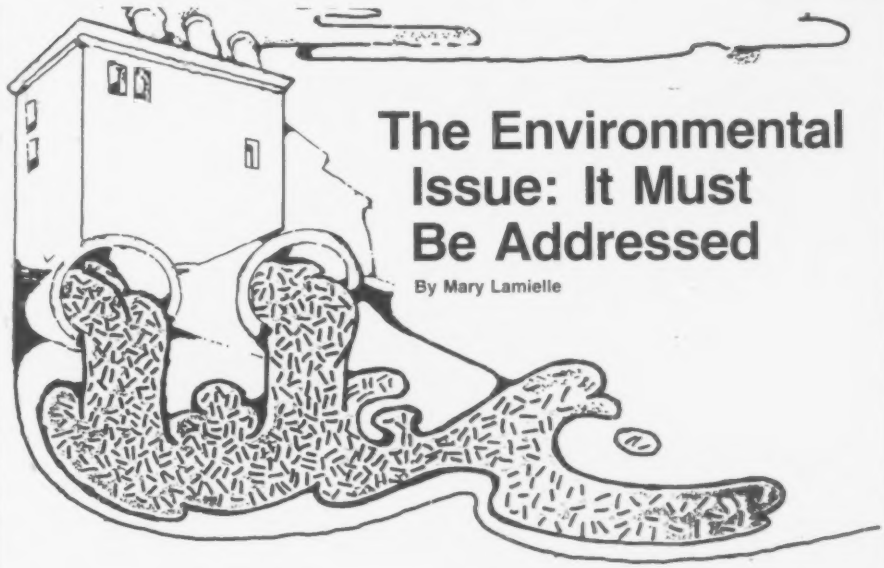

The Environmental Issue: It Must Be Addressed

By Mary Lamielle

From adhesives for new carpeting to pesticide applications, from office cleaning products to office supplies, the modern office building has, in some instances, taken on the health consequences of a toxic waste site.

Over the next decade understanding environmental risk factors may become as vital as understanding the balance sheet. Working to control these risk factors and to accommodate those employees who experience health problems from indoor pollutants will become crucial to a company's growth and productivity.

The numbers of individuals impaired or disabled by the complex array of chemicals used in buildings, in furnishings and in consumer products is increasing dramatically. Pesticides, natural gas, formaldehyde, plastics, solvents or tobacco smoke are just a handful of the many substances which can cause hypersensitive reactions in susceptible individuals. These individuals experience a kaleidoscope of mild to incapacitating symptoms from low level exposures.

Fifteen percent of this country's population has an increased "allergic sensitivity" to chemicals commonly found in household products such as detergents, solvents, pesticides, metals and rubber, placing them at increased risk to disease according to the Board on Environmental Studies of the National Research Council, the research arm of the National Academy of Sciences.

Americans spend 90% of their day indoors. Many are in new or remodeled buildings with inadequate ventilation trapping irritating, sensitizing and toxic gases and vapors. The World Health Organization estimates that up to 30% of all new or remodeled buildings cause symptoms described as "Sick Building Syndrome." These workers experience a cluster of acute complaints including eye, nose and throat irritation, nausea, weakness and fatigue.

Mary Lamielle has dedicated her life to environmental health issues.

Prolonged exposure to low level toxics may, for some employees, induce chemical sensitivity disorders. For this second population, low level indoor contaminants cause chronic, disabling symptoms.

The U.S. Environmental Protection Agency's five-year study of indoor air identified chemical sensitivity as one of two chronic health effects, the other being cancer, from the measurable collage of chemicals in the typical indoor environment. Chemical sensitivity is described as a "condition marked by progressively more debilitating severe reactions to various consumer products. The incidence of this syndrome is unknown; however, anecdotal accounts indicate that it may be increasing sharply. The effects on productivity of affected persons can be severe."

Chemical sensitivity is a chronic condition in which a single, acute toxic exposure or chronic low level exposures to chemicals result in apparent neurological and immune impairment. This condition also goes under the titles: ecological or environmental illness, environmental sensitivities, chemical susceptibilities, chemical hypersensitivities, multiple chemical sensitivities, total allergy syndrome, twentieth century illness, or CAIDS - Chemically Acquired Immune Deficiency Syndrome. Subsequent exposure to the initial incitant(s) and an increasingly wide range of related and unrelated synthetic and natural substances causes localized and systemic reactions.

Symptoms may vary from individual to individual and may depend on the trigger and the exposure method: inhalation, ingestion or skin absorption. Symptoms may include: fatigue, confusion, memory loss, neurological impairment; muscle and joint pain and weakness; respiratory involvement including frequent bronchitis, asthma and food intolerances; skin involvement with rashes, hives, eczema and flushing; cardiovascular impairment with rapid or irregular pulse and inflamed blood vessels.

Those with environmental sensitivities may find they must restructure their lives in order to survive in a synthetic world. The severity of the illness and the ability to remove, minimize or control major chemical barriers will play a significant role in determining if the chemical victim can be gainfully employed.

"To die of a rose in aromatic pain." For those with chemical sensitivity disorders, this line from 18th century poet Alexander Pope takes on a surrealistic meaning. Most of us know healthy friends or family members who find it difficult to negotiate the detergent aisle in the local supermarket theses days. Avoidance of specific fragrances or fragranced items as with other chemical barriers is not a social preference but a health imperative. It is vital that managers and fellow workers understand such intolerance for specific chemicals and the potentially devastating impact that exposure can have.

The key to successful employment for those with chemical sensitivity disorders is 1) awareness on the part of the employer; 2) a willingness to accommodate the disabled employee; 3) a spirit of cooperation on the part of coworkers.

Accommodations

Accommodations may involve a request that fragrances be minimized; that less toxic cleaning products be substituted for commercial ones; that less toxic pesticide alternatives such as boric acid be substituted for routine extermination; that no smoking policies be enforced. Less toxic office grooming activities may be beneficial for the health and safety of the rest of the workforce too with decreased medical expenses and increased productivity.

Office politics may be reduced to negotiating work spaces for those who are sensitive away from sources of disabling chemicals and outgassing vapors from copiers. cloth covered partitions or office supplies such as carbonless paper or "white out." A private or secluded work space with a window that opens, a rarity these days, would be particularly valuable as would an effort to increase ventilation.

Contingency plans, perhaps flexible hours or temporary work-at-home options, should be in place to cover unforeseen circumstances such as repairing or remodeling activities which might involve hazardous products.

The paraphernalia of the chemical victim might include an activated charcoal air filter to reduce the level of air toxins, perhaps a charcoal mask, and the possibility of a portable oxygen supply in the event of a severe exposure. Glass bottled water may replace the office coffee pot.

In a federal installation in Philadelphia the medical requirements that an aplastic anemia patient avoid exposure to synthetic pesticides was translated into a policy change. Boric acid replaced the more toxic synthetic pesticides. The spirit of cooperation, in this instance among employee, management and maintenance, paid off in a healthy, vital worker maintained in the workforce with an added health benefit in the reduction of indoor contaminants for all fellow workers.

The employer must be amenable to modification. A chemically sensitive employee for vocational rehabilitation services in the Midwest, for example, continues to be assigned site visits to industrial complexes which intensify the medical condition due to management's unwillingness to recognize the disability and its implications.

Vocational rehabilitation services should offer retraining programs for those with environmental sensitivities. This may be particularly relevant to those employed in an industrial setting who can no longer tolerate occupational exposures.

Not all modifications are successful. Modification requirements may be too extensive or too expensive. Some work settings are too contaminated. The disabled employee's health may be too precarious.

Many who are chemically sensitive are not able to travel or to tolerate a work environment. Yet some of these individuals can function within the controls of their own home for varying periods of time. They remain an untapped resource and should be considered as many companies elect to recruit more of their workforce for work-at-home options.

New laws to protect the public from health effects of the 50,000 plus chemicals on the market today can play a part in increased protection. As an example, New Jersey pesticide notification regulations expected to take effect in January 1989 will require permanent notices of pesticide application including the date of application, the name of the pesticide applied and the anticipated date for next application, for all buildings open to the public and the workplace. These notices will be of tremendous value to those whose health is dramatically impaired by such chemical treatments.

Chemical sensitivity has been the subject of a Department of Health review in New Jersey; legislation to provide services and assistance is pending. Maryland has initiated a similar review under the Department of Environment. Amendments incorporated into the federal "Indoor Air Quality Act of 1987," Senate Bill 1629, identify those with multiple chemical sensitivities as a group at increased risk from indoor pollutants. The legislation would mandate EPA to identify, examine and issue health advisories for such high risk groups.

The chemically sensitive are a bellweather for the rest of society. It is imperative that management understand this potential for illness. Reasonable accommodations for the disabled are the law. Sensitivity to chemical hypersensitivity is good business; it can affect the bottom line.

Mary Lamielle is a freelance writer and editor of *The Delicate Balance*, a quarterly newsletter with a national distribution on environmental health issues. Her address is: 1100 Rural Avenue, Voorhees, NJ 08043.

TESTIMONY OF
STEVE SHAPIRO
BEFORE THE
UNITED STATES SENATE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
SUBCOMMITTEE ON SUPERFUND, OCEAN, AND WATER PROTECTION
MAY 3, 1989

MY NAME IS STEVE SHAPIRO. I AM EMPLOYED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY IN WASHINGTON, D.C. I AM APPEARING HERE TODAY NOT ON BEHALF OF MY AGENCY, BUT BECAUSE I AM ONE AMONG MANY WHOSE HEALTH AND LIFE HAS BEEN RADICALLY AFFECTED BY THE INDOOR AIR AT EPA HEADQUARTERS. I AM NOT REPRESENTING ANY ORGANIZATION, BUT MY TESTIMONY REFLECTS THE EXPERIENCE AND THINKING OF OTHERS WHOSE HEALTH AND LIVES HAVE BEEN SIMILARLY AFFECTED.

A YEAR AGO, LONGSTANDING PROBLEMS RELATING TO THE AIR QUALITY AT WATERSIDE MALL, EPA'S CENTRAL HEADQUARTERS SITE, CAME TO A HEAD WHEN CLUSTERS OF PEOPLE IN SEVERAL LOCATIONS WITH NEW CARPET BECAME ILL. WHEN THIS WAS REPORTED TO EPA FACILITIES MANAGEMENT AT THE BEGINNING OF 1988, NO ACTION OF ANY TYPE WAS TAKEN TO IDENTIFY AND REMOVE THE SUSPECTED SOURCES OF CONTAMINATION. AS A RESULT, BUILDING RENOVATIONS CONTINUED AND ADDITIONAL EMPLOYEES BECAME ILL. WITHIN ONE BRANCH IN A DIVISION OF THE OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, EIGHT OUT OF 25 PEOPLE WERE AFFECTED. FOUR HAD TO LEAVE THE BUILDING AND FOUR HAD SIGNIFICANT HEALTH PROBLEMS, INCLUDING THE BRANCH CHIEF

AND TWO OUT OF THREE SECTION HEADS. IN ANOTHER DIVISION OF OSWER WITH ABOUT 52 PEOPLE, NINE OR TEN WERE AFFECTED, FIVE SEVERELY, ONE SOMEWHAT LESS, AND THREE OR FOUR WITH SIGNIFICANT HEALTH PROBLEMS. BY MAY, THERE WERE SEVEN OF US WHO HAD BECOME SO SEVERELY AFFECTED THAT OUR DOCTORS HAD ADVISED US TO TRY TO ARRANGE WORKING OUT OF OUR HOMES OR AT SOME OTHER LOCATION. A BROADER RANGE OF PEOPLE, WHO WERE NOT QUITE AS SEVERELY AFFECTED, STRUGGLED WITH CONTINUING TO WORK INSIDE THE BUILDING. NONE OF THE SUSPECTED SOURCES OF THIS OUTBREAK OF ILLNESS, INCLUDING THE NEW CARPETING, WAS EVER REMOVED. SUBSEQUENTLY, AT LEAST SEVEN OTHERS HAVE HAD TO LEAVE WATERSIDE.

AT EPA, PROGRAM MANAGERS, PEOPLE SICK FROM INDOOR AIR, AND VARIOUS HEALTH PROFESSIONALS, AND UNION OFFICIALS HAVE HAD A GENERALLY FRUSTRATING TIME GETTING THE AGENCY TO ACT RESPONSIBLY, RESPONSIVELY, AND COMPETENTLY.

IT IS IRONIC THAT IN RESPONSE TO PREVIOUS INCIDENTS OF ILLNESS RELATED TO NEW CARPET, EPA A FEW MONTHS EARLIER INCLUDED IN ITS EXCELLENT INTERNAL CLEAN AIR POLICY (SEE APPENDIX II) A PROVISION FOR ENSURING THAT NEW CARPET DOES "NOT EMIT CHEMICALS WHICH CAUSE HEALTH REACTIONS TO OCCUPANTS." "EMPLOYEES WILL NOT BE EXPOSED TO CHEMICALS AT LEVELS KNOWN TO BE ACUTELY TOXIC OR ACUTELY IRRITATING TO THE EYES, NOSE, OR THROAT OR CAUSE OTHER PHYSICAL ILLS TO EMPLOYEES."

I BELIEVE THAT IF MANAGEMENT HAD INITIALLY TAKEN THE PROBLEM SERIOUSLY AND TAKEN IMMEDIATE ACTION, WE COULD HAVE BEEN SPARED THE TRAUMA AND DISTRESS OF THIS ILLNESS.

THE OVERALL AIR QUALITY PROBLEMS AT WATERSIDE ARE MANY AND COMPLEX. EVEN WITH THE MANY RESOURCES AT ITS COMMAND, EPA HAS AT BEST HAD A DIFFICULT TIME DEALING WITH THESE PROBLEMS AND WITH THE EPIDEMIC OVER THE PAST YEAR.

WE HAVE YET TO LEARN THE NUMBER OF PEOPLE WHOSE HEALTH HAS BEEN AFFECTED BY RENOVATIONS DONE AT WATERSIDE OVER THE PAST YEAR AND A HALF, BUT MINIMUM NUMBERS INCLUDE:

.MORE THAN 5 EPA EMPLOYEES WHO HAVE LEFT EPA FOR HEALTH REASONS ARISING FROM AIR QUALITY

.AT LEAST NINE EPA EMPLOYEES WHO ARE AT HOME OR IN ALTERNATIVE WORK SPACE

.OVER 100 EPA EMPLOYEES WHO HAVE GONE TO THE HEALTH UNIT OVER EFFECTS FROM AIR QUALITY

.76 EPA EMPLOYEES WHO REPORTED ILLNESS AT THE HEIGHT OF THE CARPET CRISIS TO THE AGENCY'S HEALTH AND SAFETY INVESTIGATOR

BUT THIS IS JUST THE TIP OF THE ICEBERG. THERE ARE THOSE WHO DON'T KNOW THAT IT IS THE INDOOR AIR AT EPA THAT IS AFFECTING THEIR HEALTH AND PRODUCTIVITY. THROUGHOUT THE WORK WEEK THESE PEOPLE POP SUDAFEDS AND GO THROUGH A BOX OF KLEENEX. THERE ARE A GOOD MANY WHOSE HEALTH AND PRODUCTIVITY HAD BEEN AFFECTED FOR A TIME OR STILL ARE AFFECTED, BUT NOT TO THE EXTENT THAT THEY WERE COMPELLED TO STAY OUT OF WATERSIDE. THERE ARE THOSE WHO HAVE LEFT EPA WITHOUT FORMALLY REPORTING THAT THEY LEFT DUE TO ILLNESS. SOME FOUND UPON LEAVING THE BUILDING THAT THEIR HEALTH PROBLEMS DISAPPEARED. AND FOR ALL THE ABOVE SITUATIONS, THERE ARE NUMEROUS CONTRACT EMPLOYEES, RETIREES WORKING FOR EPA THROUGH THE AMERICAN ASSOCIATION OF RETIRED PERSONS, STAY-IN-SCHOOLS (HIGH SCHOOL AND COLLEGE STUDENTS), AND CONTRACT BUILDING SERVICE AND SECURITY STAFF WHO HAVE NEVER EVEN BEEN COUNTED.

THE RANGE OF SYMPTOMS INCLUDES A VARIETY OF MODERATE AND ACUTE RESPIRATORY PROBLEMS; HEADACHE; SORE THROAT; BURNING EYES, LUNGS, AND SKIN; RASHES; FATIGUE; LARYNGITIS; CLUMSINESS; DISORIENTATION; LOSS OF BALANCE; NAUSEA; NUMBNESS IN EXTREMITIES AND FACE; AND DIFFICULTY WITH MENTAL TASKS. THE OCCUPATIONAL HEALTH PHYSICIANS SOME OF US HAVE SEEN SAY THE MOST COMMON PROBLEMS INCLUDE UPPER AND LOWER RESPIRATORY IRRITATION,

INTOXICATION-TYPE SYNDROME, OCCUPATIONAL ASTHMA, AND CHRONIC HYPERSENSITIVITY PNEUMONITIS. THE EFFECTS ON THE CENTRAL NERVOUS SYSTEM EXPERIENCED BY MANY OF US DON'T LEND THEMSELVES TO READY DIAGNOSIS. SOME OF THE PEOPLE WHO HAVE BEEN AFFECTED, BUT NOT TO THE POINT WHERE THEY HAVE BEEN COMPELLED TO LEAVE THE BUILDING, EITHER SEE NO PHYSICIAN AT ALL OR SEE A FAMILY DOCTOR OR ALLERGIST WHO IS NOT FAMILIAR WITH OCCUPATIONAL OR ENVIRONMENTAL HEALTH.

THERE ARE SOME WHO ARE ABLE TO FUNCTION IN MOST BUILDINGS OTHER THAN WATERSIDE. SOME HAVE NO PROBLEMS VISITING HAZARDOUS WASTE SITES FOR A WEEK AT A TIME, BUT BECOME ILL AFTER 15 MINUTES INSIDE WATERSIDE. OTHERS HAVE BECOME PROGRESSIVELY REACTIVE TO TRACE AMOUNTS OF THE MYRIAD VOLATILE ORGANIC COMPOUNDS MOST PEOPLE TAKE FOR GRANTED. THERE ARE THOSE WHO SUFFER WHEN EXPOSED TO THE BIOLOGICAL AGENTS IN THE AIR AT WATERSIDE, WHEN EXPOSED TO AREAS THAT WERE RENOVATED OR CARPETED DURING THE LAST FEW YEARS, OR WHEN THE VENTILATION SYSTEM IS NOT OPERATING NORMALLY OR NOT OPERATING AT ALL -- BUT WHO RECOVER OVER TIME.

APPENDED TO THIS TESTIMONY ARE PERSONAL HISTORIES OF A FEW PEOPLE WHOSE HEALTH AND LIVES HAVE BEEN AFFECTED BY THE AIR QUALITY AT EPA HEADQUARTERS.

WHAT HAPPENED TO US

THERE ARE PEOPLE WITH ALLERGIES WHO MAY BE AT SPECIAL RISK TO INDOOR AIR QUALITY PROBLEMS, AND THIS RISK SHOULD BE CONSIDERED IN THE FORMULATION OF INDOOR AIR QUALITY STANDARDS. BUT ILLNESS FROM INDOOR AIR DOES NOT RESPECT AGE OR HEALTH. MOST OF US WHO CAN NO LONGER WORK INSIDE WATERSIDE HAVE NOT HAD A HISTORY OF ALLERGIES. OUR GROUP INCLUDES PEOPLE IN THEIR PRIME, IN THEIR TWENTIES, EX-JOGGERS, AN EX-MARATHON RUNNER, A KARATE BLACK BELT, AND OTHERS WHO WERE IN GOOD HEALTH BEFORE THEY WERE AFFECTED. THERE ARE INDIVIDUAL CHEMICALS OR COMBINATIONS OF CHEMICALS FOUND IN OFFICES AND OFFICE BUILDINGS - NOT ALL NECESSARILY COME FROM CARPET AND RENOVATION MATERIALS - WHICH CAN APPARANTLY PRODUCE SHORT- AND LONG-TERM HEALTH EFFECTS. ALTHOUGH OUR ILLNESS WAS PREVENTABLE, NONE OF US, EXCEPT FOR SOME OF THOSE WHO HAVE BECOME ILL THIS YEAR, WERE WARNED.

WHEN YOU FIRST FEEL ILL, YOU TRY TO DENY IT BECAUSE YOU DON'T WANT TO INTERRUPT YOUR WORK AND YOUR HOME LIFE. YOU WONDER WHAT KIND OF BUG YOU HAVE - SOME OF US THOUGHT WE MIGHT HAVE HAD MONO, AIDS, OR LYME DISEASE. SOME OF THOSE AFFECTED REACHED A TURNING POINT WHERE THEY IMPROVED OR THEY STABILIZED TO WHERE THEY COULD FUNCTION AT A REDUCED LEVEL INSIDE WATERSIDE. OTHERS GOT WORSE. MOST OF US WHO CAN NO LONGER GO INTO WATERSIDE, HAVE NOT BECOME LESS REACTIVE. SOME HAVE BECOME PROGRESSIVELY MORE REACTIVE. I'M SPEAKING OF REACTIONS TO PARTS PER MILLION,

BILLION, OR EVEN TRILLION OF SUBSTANCES OR COMBINATIONS OF SUBSTANCES WHERE REACTIONS ARE NORMALLY ASSOCIATED WITH PARTS PER THOUSAND.

THE LONG ROAD OF DECISION-MAKING

WHEN SOMEONE WHO WORKS AT EPA COMES TO UNDERSTAND THAT HE OR SHE IS BECOMING ILL FROM EXPOSURE TO A CHEMICAL OR A COMBINATION OF CHEMICALS IN THE AIR, WORKER, SUPERVISORS, MANAGEMENT, AND TREATING PHYSICIANS MAY EMBARK ON A LONG ROAD OF DECISION-MAKING. AS A WORKER, YOU HAVE TO CHOOSE WHETHER TO TOUGH-OUT FEELING SICK IN THE HOPE THAT IT WILL PASS, ALTHOUGH NOT ATTENDING TO YOUR ILLNESS MAY RESULT IN WORSE ILLNESS; OR TRY TO TAKE CARE OF YOURSELF, ALTHOUGH THIS MAY RESULT IN DISRUPTIONS TO YOUR WORK AND ULTIMATELY YOUR CAREER, YOUR ORGANIZATION, YOUR PERSONAL WELFARE, AND YOUR FAMILY'S WELFARE. A COMMON CHOICE IS TO DENY THAT YOU SHOULD DO ANYTHING ABOUT THE PROBLEM.

SUPERVISORS FACE ISSUES OF HOW TO KEEP A WORKER INTEGRATED IN THE ORGANIZATION. VARIOUS SUPERVISORS HAVE SAID THEY ARE AT A LOSS AS TO WHAT TO DO WITH SOMEONE WHO IS UNABLE TO WORK AT FULL CAPACITY OR WHO CAN'T COME INTO THE OFFICE, ATTEND MEETINGS, AND WORK WITH OFFICE DOCUMENTS AND EQUIPMENT. WHAT ARE A SECRETARY AND SUPERVISOR TO DO WHEN THE SECRETARY CAN'T BE IN THE

OFFICE TO HANDLE PAPERWORK AND TELEPHONES AND HELP OTHERS AS NEEDED?

WHEN SOMEONE CAN'T BE ON LOCATION TO CONTRIBUTE TO A PROJECT, YOU CAN TRY WAYS TO GET AROUND THIS WITH TELECOMMUNICATIONS - SPEAKER PHONES, FAXING, AND MODEMS - BUT OFTEN THIS IS INCONVENIENT, INEFFICIENT, DISRUPTIVE, OR UNWORKABLE.

YOU GO TO A DOCTOR FOR ADVICE AND BOTH OF YOU ARE FACED WITH A DILEMMA: DO YOU CONTINUE AT WORK AND RISK GETTING SICKER WITH AN ILL-DEFINED ILLNESS THAT NO ONE UNDERSTANDS? DO YOU WITHDRAW FROM THE WORKPLACE AND STOP GOING TO OTHER PLACES WHERE LOW EXPOSURES CAN AFFECT YOU, IN THE HOPE THAT YOU MIGHT RECOVER FROM BOTH THE EFFECTS OF THE SICKNESS AND FROM THE GENERAL CONDITION? THERE IS NO WAY TO PREDICT WHETHER OVER TIME YOU WILL RECOVER FROM THIS CONDITION. DO YOU GIVE UP YOUR JOB TO TRY OUT ANOTHER WORKPLACE ON A GAMBLE THAT IT TOO WON'T CAUSE YOU TO BE SICK? DO YOU BECOME A RECLUSE AND AVOID GOING TO NEW PLACES BECAUSE THE AIR MIGHT MAKE YOU SICK?

WE EXCHANGE EXPERIENCES AMONG OURSELVES ABOUT OTHER OFFICE BUILDINGS, HOTELS, STORES, MALLS, INDOOR MARKETS, SCHOOLS, DOCTOR'S OFFICES, HOSPITALS AND CLINICS, RESTAURANTS, PLACES OF WORSHIP, GREENHOUSES, AND OTHER PLACES THAT AFFECT US TO MINIMIZE THE RUSSIAN ROULETTE EFFECT ON US OF BREATHING INDOOR AIR. THIS

IS SOMEWHAT HELPFUL, BUT WE ALL DON'T REACT TO THE SAME THINGS, TO THE SAME DEGREE, OR AT THE SAME RATE.

OUR LIVES ARE FULL OF SURPRISES. YOU WALK INTO A PLACE YOU THOUGHT SAFE, ONLY TO BE CAUGHT IN FUMES FROM PAINT, CLEANING AGENTS, PERFUME, NAIL POLISH, TOLUENE/XYLENE MAGIC MARKERS, WHITE-OUT, NEW FURNITURE, ELECTRONIC EQUIPMENT AND JET INK PRINTERS, PLASTIC OBJECTS, PLASTIC WRAPPING, GLUE, MASTICS - THE LIST NEVER ENDS.

WHEN YOU GET A REACTION, THE EFFECTS ARE OFTEN NOT CONFINED TO WORK. THEY CAN STAY WITH YOU FOR DAYS OR WEEKS, AFFECTING YOUR HOME LIFE AND OTHER ACTIVITIES. IS IT SENSIBLE TO IGNORE THE SYMPTOMS - YOU OFTEN REACT IN BUILDINGS TO THINGS YOU CAN'T EVEN SMELL OR YOU SMELL BUT DON'T RECOGNIZE - AND ENDURE THE PHYSICAL MISERY AND TEMPORARY MENTAL DISFUNCTION? OR IS IT SENSIBLE TO DROP OUT OF YOUR LIFE AND LIVE AS A RECLUSE AT HOME OR IN A REMOTE AREA TO AVOID THE VOLATILE CHEMICALS OF THE 20TH CENTURY? THERE ARE NO GOOD ANSWERS TO THIS DILEMMA.

RECOMMENDATIONS

THE BILL YOU ARE CONSIDERING IS A GOOD ONE. WHAT FOLLOWS ARE RECOMMENDATIONS FOR EMPHASIS OR INCLUSION.

INDUSTRIAL HYGIENE

THERE IS A NEED FOR BETTER UNDERSTANDING OF THE RANGE OF INDOOR AIR CHEMICALS THAT CAN AFFECT PEOPLE, ESPECIALLY CHEMICALS IN COMBINATIONS, RATHER THAN JUST SINGLE CHEMICALS.

ALGORITHMS. PEOPLE WHO RUN BUILDINGS NEED TO BE TRAINED IN THE RUDIMENTS OF PUBLIC HEALTH AND NEED AN ALGORITHM TO EVALUATE A BUILDING AND TO EVALUATE PROBLEM AREAS WITHIN A BUILDING.

AIR QUALITY STANDARDS. CONSENSUS STANDARDS FOR ACCEPTABLE INDOOR AIR QUALITY, SUCH AS ASHRAE, SHOULD BE REEVAULATED TO ACCOUNT FOR BUILDING RENOVATIONS, CARPETING, ELECTRONIC EQUIPMENT, AND BIOLOGICAL AGENTS; AND ADDRESS AIR QUALITY FOR ALL PERSONS - HEALTHY, SICK, ALLERGIC, AND CHEMICALLY REACTIVE.

BUILDING CODES. BUILDING CODES SHOULD BE DEVELOPED TO INTEGRATE GOOD INDUSTRIAL HYGIENE PRINCIPLES.

IDENTIFYING HAZARDS

LABELLING. THE HAZARDS OF CHEMICALS USED IN BUILDING CONSTRUCTION AND RENOVATION AND MAINTENANCE, FURNISHINGS, OFFICE EQUIPMENT AND SUPPLIES, AND PERSONAL ITEMS SUCH AS NAIL POLISH, PERFUME/COLOGNE SHOULD BE LABELLED. BUILDING MANAGERS, OCCUPANTS, AND VISITORS HAVE A RIGHT, NEED, AND RESPONSIBILITY TO KNOW AND ADDRESS THESE HAZARDS.

RIGHT TO KNOW. ALL NEED TO KNOW WHAT MATERIALS ARE HIGH-EMITTERS AND WHAT ARE LOW-EMITTERS OF VOLATILES, AND WHAT CHEMICALS ALONE OR IN COMBINATION CAN MAKE PEOPLE ILL. SPECIAL EFFORT SHOULD BE MADE TO IDENTIFY CHEMICALS OR COMBINATIONS WHICH AT VERY LOW CONCENTRATIONS CAN PRODUCE ADVERSE HEALTH EFFECTS. AIR SAMPLING IS A POOR SOLUTION FOR EVALUATING THESE HAZARDS. IT'S EXPENSIVE, NOT PRACTICAL, METHODS FOR MANY CHEMICALS ARE NOT AVAILABLE, AND AIR SAMPLING DOESN'T ADDRESS CHEMICALS ACTING IN COMBINATION.

CHEMICAL HYPERSENSITIVITY. AN INITIATIVE SHOULD BE UNDERTAKEN TO RESEARCH THE CAUSES, TREATMENT, AND PREVENTION OF CHEMICAL HYPERSENSITIVITY.

BUILDING MANAGEMENT

AIR QUALITY ADVOCATES. PROGRAMS SHOULD BE DEVELOPED TO ESTABLISH AIR QUALITY ADVOCATES IN BUILDINGS. SUCH A PERSON SHOULD HAVE AUTHORITY TO CONTROL WHAT MATERIALS ARE INTRODUCED INTO A BUILDING BY ANYONE, INCLUDING OCCUPANTS AND VISITORS, AND TO DIRECT REMOVAL OF CONTAMINANTS.

OUTBREAKS OF ILLNESS. CRITERIA SHOULD BE DEVELOPED FOR AN APPROACH TO PREVENT, MONITOR, AND DEAL WITH INCIDENTS OF BUILDING-RELATED SICKNESS. THIS SHOULD INCLUDE MEDICAL TREATMENT, CAREER AND PERSONAL COUNSELLING FOR VICTIMS; AND WAYS BUILDING MANAGERS CAN RESPOND EFFECTIVELY TO PROTECT PEOPLE'S HEALTH.

HELPING VICTIMS

A FEDERAL PROGRAM SHOULD BE ESTABLISHED TO ADDRESS THE PERSONAL CONDITION OF THOSE WHO BECOME SICK FROM INDOOR AIR. SOME MAY BE IN A POSITION TO GET COMPENSATION, OTHERS NOT. WHO SHOULD PAY FOR LOSSES OF INCOME AND OTHER EXPENSES AND HOW IS ONE TO RECOVER THESE LOSSES?

SPECIAL ADVOCACY AND VOCATIONAL REHABILITATION PROGRAMS SHOULD BE ESTABLISHED FOR SERIOUSLY AFFECTED PEOPLE.

CONCLUSION

FEW HEALTH PROBLEMS OCCUR IN ONLY ONE PLACE AND AT ONLY ONE TIME. I BELIEVE THAT WHAT HAPPENED TO US AT EPA HAS HAPPENED ELSEWHERE. WHAT HAPPENED TO US DEMONSTRATES THE FAILURE OF OSHA'S SYSTEM OF PERMISSIBLE EXPOSURE LIMITS AND THRESHOLD LIMIT VALUES TO PROTECT OUR HEALTH AND THE FAILURE OF EPA'S SYSTEM OF REGULATING CHEMICALS UNDER THE TOXIC SUBSTANCES CONTROL ACT. I BELIEVE THAT THESE INADEQUATE SYSTEMS ARE LEAVING A WRECKAGE OF HUMAN LIVES IN THEIR WAKE. IT IS PAST TIME TO CHANGE HOW WE PROTECT PEOPLE FROM THESE CHEMICALS.

NOTE: Attachments to this statement have been retained in committee files.

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AMERICAN LUNG ASSOCIATION
The Christmas Seal People ®

STATEMENT OF PHILIP BROMBERG, M.D.

ON BEHALF OF

THE AMERICAN LUNG ASSOCIATION

TO THE

SUBCOMMITTEE ON SUPERFUND, OCEAN, AND WATER PROTECTION

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE

RE: INDOOR AIR POLLUTION

MAY 3, 1989

Mr. Chairman, members of the Subcommittee, I am Dr. Philip Bromberg, Director of the School of Medicine Center for Environmental Medicine, at the University of North Carolina.

I am presenting comments today on behalf of the American Lung Association. ALA is the nation's oldest voluntary health organization and is dedicated to the prevention and control of lung disease. The ALA, along with its medical section, the American Thoracic Society, has long recognized the contribution of air pollution, both indoors and outdoors, to the development or exacerbation of lung disease. The ALA has been implementing programs to ensure healthful air quality since 1966. I have had the opportunity to appear before the Subcommittee on Environmental Protection on prior occasions to discuss ambient air pollution in the outdoor environment. Although the subject this morning is indoor air pollution, the problems being explored are very similar.

Traditionally, we have believed that air pollution is primarily an outdoor problem and that the indoor environment provides protection from outdoor pollution. However, the indoor environment is perhaps more polluted than the outdoor environment. The average individual spends from 75 percent to 90 percent of the time in this potentially unhealthful environment. A rapidly enlarging body of literature has described sources of pollutants and exposures to pollutants in the indoor environment. While many health effects of indoor pollutants remain controversial, some effects have been described with certainty and should be considered clinically relevant.

In March 1988, ALA's medical section, the American Thoracic Society, convened a two-day workshop on the subject of control of indoor air quality and health. The workshop was prompted by the limited and controversial nature of published information in the area and the need for critical review of the evidence by an appropriately multidisciplinary group of experts. It was held at a time when the emerging information on health effects quickly led to questions concerning control approaches. The American Lung Association regards the workshop as an important step in providing scientifically grounded advice to physicians and the public on control of indoor air pollution. The proceedings of the workshop, "Environmental Controls and Lung Disease," will be published as a supplement to the ALA's journal, The American Review of Respiratory Disease, and will be made available to this Subcommittee.

As with outdoor air pollution, the lung is both the portal of entry and primary site of injury when exposed to indoor air pollution. The populations considered sensitive to outdoor air pollution are also the same populations considered sensitive to indoor air pollution--infants and young children, pregnant women, the elderly, and those with pre-existing chronic illnesses, such as lung or heart disease. The effects are complex and manifestations of these effects may range from the most obvious, such as eye irritation, to the various disease states. The effects may occur quickly upon exposure or become apparent only after delays of several days or even years. The effects are also complicated by the different concentrations and durations of exposure experienced in the indoor environment. The types of pollutants and their effects include:

- **Biological aerosols** including aero-allergens, which are plant or animal materials, are capable of sensitizing some

individuals and thereafter producing allergic reactions; aero-pathogens include bacteria and viruses.

- **Formaldehyde** is an irritating and probably carcinogenic gas emitted from several types of consumer products such as particle board, plywood, insulation, and fabrics.
- **Radon** is a radioactive gas produced by radioactive decay of radium, an element widely distributed in the earth's crust, which increases the risk of lung cancer.
- **Asbestos fibers**, widely used previously in building materials, can cause asbestos-related lung disease, including mesothelioma and lung cancer.
- **Carbon monoxide** is an odorless gas produced in any process of incomplete combustion, such as that resulting from tobacco, gas stoves, and unvented or improperly functioning heating equipment. Carbon monoxide interferes with the supply of oxygen to the body's tissues.
- **Nitrogen dioxide** is a principal respiratory irritant that may interfere with the body's defense against respiratory infections. It is the product of high-temperature combustion, such as from gas stoves, unvented heaters, and tobacco smoking.
- **Tobacco smoke** is comprised of more than 3,800 chemical compounds, most of which are toxic and 60 of which are known carcinogens. Involuntary smoking, that is exposure to tobacco smoke, is a cause of disease, including lung cancer, in healthy nonsmokers.
- **Household pesticides** are used inside approximately 84 percent

of American homes. Of these households, between four and five percent of the residents are estimated to have experienced acute toxic reactions after use.

- o **Household solvents** commonly contain butoxyethanol and xylenes for which there is some evidence of teratogenicity.

Although indoor air pollution is recognized as a public health problem probably more serious than outdoor air pollution, the federal government has not acted to protect public health. To date, no single federal agency has been given the jurisdiction for ensuring healthful air quality in the nonworkplace indoor environment. A range of federal agencies has partial authority: the Environmental Protection Agency under the Toxic Substances Control Act has authority to control or limit the manufacture of hazardous chemicals and is also responsible for radiation; the Occupational Safety and Health Administration is responsible for ensuring a healthful workplace although this responsibility has not been interpreted as ensuring healthful air quality inside office buildings; the Department of Energy is responsible for energy conservation in homes and new buildings but does not address the impact of such policies beyond energy savings; the Consumer Product Safety Commission evaluates the health and safety effects of consumer products but has used this responsibility only to a limited extent to address indoor air pollution from such products. These agencies and others also participate in the Interagency Committee on Indoor Air Quality, co-chaired by EPA and CPSC to coordinate the indoor air pollution research activities of the federal government.

ALA believes that the primary obstacle to federal action to control indoor air

pollution is this lack of clear regulatory authority. As such, the ALA recommends that Congress give clear regulatory authority to EPA to ensure healthful indoor air quality.

The "Indoor Air Quality Act of 1989" (S. 657) introduced by you, Mr. Chairman, and other members, is a positive step by the federal government towards shaping the appropriate regulatory approach. It is clear that as the program progresses additional effort will be needed.

S. 657 represents a carefully constructed approach for initiating the federal government's program to control indoor air pollution. The bill establishes a research program to continue the identification and characterization of the problem as well as provision for technology development for the control of indoor air pollution. The bill creates a grant program to states for the assessment and management of specific indoor air pollution problems--a provision critical to the ability of the government to address the range of indoor air pollution problems. Finally, the bill requires EPA to develop a National Indoor Air Quality Response Plan to describe the actions to be taken to control indoor air pollution exposures.

The ALA offers the following comments regarding specific provisions of S. 657:

- **Sec. 5: Indoor Air Quality Research**

  A specific objective for research conducted under this section should be the compilation of information necessary to enable the Agency to proceed with tasks required by other sections, including the Indoor Contaminant Health Advisories. Critical

to this task is research activity on improved methods for communicating with the public concerning indoor air pollution --both health effects and control technologies. Further, research activity to develop better methods for detecting and quantifying truly hazardous chemicals is needed. Equally important is research into and the application of new techniques in epidemiology to address the problems of low and chronic dose exposures.

We would also suggest specific reference requiring EPA collaboration with the National Institute for Environmental Health Sciences. This Institute is responsible for the Biometry and Risk Assessment Program, the National Toxicology Program, and the Toxicology Research and Testing Program, all of which address the wide variety of problems directly related to evaluating the human health effects of the major hazardous substances in the indoor environment.

- **Sec. 6: Indoor Air Contaminant Advisories**

In our opinion, a primary function of any indoor air pollution control program is the provision of health effects information. This legislation carefully crafts a mechanism for developing health advisories with a dual purpose--information to state and local officials for use in their control activities and information to the public to facilitate their understanding of the problem and need for mitigation measures.

We endorse the compilation of a list of contaminants and stress the importance of public participation in the development of the list. It is critical that the advisory be prepared with the public in mind to facilitate understanding of the information and its use. In this regard, the advisory must carefully and concisely state where there is no known safe concentration for a particular pollutant--especially for known or suspected human carcinogens. Although not specifically noted, we would also recommend the advisory also state recommended mitigation measures where they exist.

Because of the critical need for the information which will be contained in the health advisories, we would recommend a more rapid timeframe for development of the advisories. In this regard we would also suggest that during revision of advisories due to new scientific information, the Agency be directed to consider an addendum to the existing advisory where practicable rather than complete revision. As is now the case with the revision of the National Ambient Air Quality Standards mandated by the Clean Air Act, the complete revision is lengthy and costly and not always necessary.

- **Sec. 7: National Indoor Air Quality Response Plan**

  This section requires the Agency to delineate a plan outlining actions to be taken to reduce human exposures to indoor air pollution. The planning process is to rely principally upon

existing authorities. Information dissemination and technical assistance activity are also addressed. In suggesting possible actions not specifically noted, we would recommend that the Agency consider immediate as well as long term actions. For example, the phase-down or phase-out of a particular contaminant can have immediate results in terms of human exposure. Long term actions may address technology development mechanisms.

- **Sec. 9: State and Local Air Quality Programs**

  Recognizing innovative activity by state and local governments, S. 657 provides for grant programs in management and assessment, and response. The ALA supports the inclusion of this section and commends the sponsors for providing for public comment on management and assessment strategies. Such comment should also be allowed on the response program.

  We would recommend addition of a requirement for summary reports to Congress specific to the status and results of this grant program. Further, such reports should also be made available to state and local governments and the general public as part of the Agency information and education activities.

- **Sec. 10: National Indoor Air Quality Council**

  The legislation provides for the creation of a National Indoor Air Quality Council to provide for coordination of all federal

agency activity. We would recommend the addition of specific representatives from the National Institute for Environmental Health Sciences and the National Institute for Occupational Safety and Health.

- **Sec. 12: Indoor Air Quality Information Clearinghouse**
  The legislation provides for the establishment of a National Indoor Air Quality Information Clearinghouse. The ALA believes such a Clearinghouse is essential to providing the public with accurate information in a timely fashion.

- **Sec. 15: Authorizations**
  The legislation provides for specific authorizations for Section 5, Indoor Air Quality Research. The ALA recommends expansion of the budget resources available for the basic research effort. Considerable work remains to be done to characterize the nature and extent of the problem and the corresponding health effects.

* * * *

In summary, Mr. Chairman, S. 657 creates a program that is scientifically sound and a reasonable approach to the range of health effects caused by indoor air pollution. There is sufficient knowledge about the health risks of indoor air pollution and federal intervention can no longer be avoided. As we have advised about outdoor air pollution, we cannot wait for all of the answers before we take action-- the American people deserve a safe and healthful environment, indoors and outdoors. The ALA believes that prudent public health action is to pass S. 657.

TESTIMONY OF

MARJORIE ANN BROWNE

CONGRESSIONAL RESEARCH EMPLOYEES ASSOCIATION

LIBRARY OF CONGRESS

before the

SUBCOMMITTEE ON SUPERFUND, OCEAN, AND WATER PROTECTION

SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

on

INDOOR AIR QUALITY AND LIBRARY OF CONGRESS STAFF
IN THE JAMES MADISON MEMORIAL BUILDING

WEDNESDAY, MAY 3, 1989

19-479 - 89 - 4

I welcome the opportunity to share with you the experiences of the Library of Congress staff who work in the James Madison Memorial Building, as they may relate to poor indoor air quality and other symptoms of sick building syndrome. I am speaking on behalf of the Congressional Research Employees Association, the labor organization that represents employees of the Congressional Research Service, but my statement covers the experiences of other Library staff as well. I have been a labor member of the Library's Joint Labor-Management Health and Safety Committee for six years and the information in this statement draws also on the data available to the committee, but without revealing names, over the nearly nine years that the Madison Building has been occupied. The opinions expressed here do not reflect the positions of either the Congressional Research Service, the Library of Congress, or the Health and Safety Committee.

Current EPA/NIOSH Study

Press coverage on indoor air quality over the past year has occasionally cited the Madison Building as a source of problems related to poor indoor air quality and sick building syndrone symptoms. During early 1989, the Environmental Protection Agency (EPA), the National Institute for Occupational Safety and Health (NIOSH), and Yale University's John B. Pierce Foundation started a preliminary evaluation of the Madison Building work environment. Over 80 percent of the Library staff in the building filled out an extensive "Indoor Air Quality Survey" questionnaire. Thereafter, the environmental monitoring and sampling phase of the pilot study included monitoring for thermal comfort, measurement of volatile organic agents in the atmosphere, and sampling for biological contaminants. Personnel from the

Institute of Standards and Technology (NIST, formerly the National Bureau of Standards), currently engaged in a separate year-long ventilation assessment study of the Madison Building under contract to the Department of Energy, also participated in the study. Preliminary results from the EPA/NIOSH/Pierce Foundation study should be available by early summer 1989.

Overview of Complaints

The impetus for the study described above resulted from the persistent complaints made by staff and by labor organizations to the Library and to NIOSH ever since the Madison Building became occupied, starting in December 1979/January 1980. These observations were usually related to air quality in the building: the temperature is too cold or too hot; there is no air circulation; the odor of grilled hamburgers permeates certain locations; the smells of dead fish or wet dog or musty odors exist in office space at certain times of the year; the humidity is either very low or, at other times, excessive. In addition, many staff suffer from an increase in the number of respiratory illnesses, while other staff find they can no longer wear contact lenses at work.

The Range of Symptoms -- 1980-1986

The following are among the symptoms reported by Library staff between the years 1980 and 1982 as they worked in the Madison Building. Many of these symptoms persist today:

- burning sensation in eyes, dryness of skin, persistent cough, skin rash and soreness in neck area during hours of work only. Also, frequency of urination has increased. These symptoms are not present when not at work.

- red eyes during working hours (person wears contact lenses); redness disappears within a resasonable period after leaving building;

- a latent dusty, moldy smell within the work area, especially significant after an absence from the work place for a few days. Odor is irritating.

- Office humidity level or some other factor is causing itching and dry skin.

- Air is very dry, causes headaches and general uneasiness.

- Is the JMMB filtering system doring its job adequately? Temperature control is very poor; it tends to be too hot.

- The air is apparently very dry in the Madison Building. I have noticed the following dramatic changes since working here: (1) difficulty in wearing contact lenses after successfully wearing them 12-15 hours a day, 7 days a week; red, puffy eyes and eyelids; (2) allergy problems -- stuffy head and nose, dry throat and hacking cough; (3) excessively dry skin when the skin is normally oily; and (4) frequent nosebleeds.

- Since the onset of the heating season, the temperature in my work area has been in a constant range of between 76 and 80 degrees F as measured by a wall thermometer. This temperature has been accompanied by extremely low humidity levels. The effect has been to create an atmosphere more conducive to sleep and the breeding of germs than to productive work. Steps taken by the engineers to set the thermostat to a lower temperature have not resulted in any change in the temperature.

In late 1984, in response to continual complaints from a particularly problematic office area, the Health and Safety Committee arranged for a team of three observers to visit this office area at different times during a one-week period. Staff in the office had forwarded to the committee the following complaints:

- Headachès in the afternoons; cold in the mornings; hot in the afternoons.

- For the second day in a row, I have experienced a headache during the mid-afternoon hours beginning at approximately 2:30. I suspect the air quality may be related to these headaches.

- On many occasions I have been bothered by severe headaches and sinus distress -- symptoms which do not respond to the usual headache medication and/or antihistamines. Also, these problems are often accompanied by nausea and extreme drowsiness as well. The problems are generally alleviated by leaving the building for a period of time.

- Uneven air temperatures -- morning hours can be quite cold and afternoon hours overly warm. Quality of air varies, e.g., occasionally air contains contaminants which cause sneezing fits, and occasionally [air] is so lacking in fresh oxygen that alertness is difficult to maintain.

- On a number of occasions, I have developed a severe headache while at work in the Madison Building. It is very much like a sinus headache. Very shortly after leaving the building, either at lunch time or at the end of the day, the headache clears up. I believe the headaches are caused by some condition that exists in the building itself. Generally, taking aspirin or some other mild analgesic does not help.

The team of observers who monitored this space noticed "heaviness in the air, inconsistency in air flow, and a musty smell." One observer "felt sinus pressure while walking through the area."

In 1985, the Health and Safety Committee received notice that an employee working in this same location resigned from the Library, primarily because the conditions in her work area made it hard for her to breathe. She experienced asthma attacks triggered by her physician-diagnosed allergy to indoor dust. She suffered from Hay Fever/Allergic Rhinitis/Asthma conditions and was also allergic to cigarette smoke.

During 1986, ventilation-related complaints included the following --

- One employee complained of an odor just outside his office -- a humid odor similar to that of a stagnant fish tank which has not had clear water for a while. It is not the smell of tobacco smoke, food, or cleaning agents. This odor was so strong that the employee took sick leave the following day. This was not the first time the odor has appeared.

- I believe the air quality may have contributed to a bacterial infection which resulted in my hospitalization.

- Experienced discomfort in eyes, irritation, swelling, muscle spasm, beginning during the first part of March and continued, growing to the point of considerable concern. Saw ophthalmologist who diagnosed: allergic conjunctivitis. This condition started before pollen time and I never had any pollen allergy previously. Noticed about the same time as the contaminated water fiasco and during days of strong chemical odor. Condition alleviated somewhat by prescription by physician but by no means entirely. Some muscle spasm persists, burning, etc. Incidentally, no change in eyeglass prescription required.

Complaints and symptoms have continued since 1986. In some instances, staff have successfully pursued correction of ventilation problems by persistent calls to the building engineers. In other instances, staff have suffered in silence. Many staff wait eagerly for the results of the EPA/NIOSH study.

Specific Cases

Some specific cases dramatically illustrate the health impact that indoor air quality problems might have. At this time, a direct causal link between poor indoor air quality and the health difficulties experienced in these three cases has not been proven. The concern and perception of a linkage, however, persists.

In the first instance, staff of one of the first Congressional Research Service divisions to move into the Madison Building found two or three two-person offices that were and still are consistently difficult to ventilate adequately. Staff regularly complained of "dead air" or no air circulation. Temporary relief measures would last for a day or so and then poor or no air circulation would resume. At times, wide ranges of temperature would be experienced in the particular division, with one end freezing and another part,

too hot or gasping for air. It appeared that no actions taken to correct the situation could maintain adequate temperature conditions on a permanent basis. One staff member who worked in this "dead air" location developed possible Legionnaires' Disease. Fortunately, he recovered from the severe illness and found a job with another agency. Even more fortunate, this was an isolated event, not typical of the epidemic nature of Legionnaires' Disease.

In the next case, an employee who began work in the Madison Building in October 1987 started to suffer from respiratory illnesses that came with increasing frequency. This was very unusual for her. These were not just mild illnesses or bad colds. She experienced respiratory distress, had fluid in the head and chest, fever, and marked fatigue. After eliminating other possible causes for the increase in respiratory illnesses, her physician sent her to an allergist, who found she had developed an allergy to a form of mold. A March 1989 physical examination revealed that over the past year she had lost significant lung function capacity, usually judged excellent since she is a singer. Her physician and allergist attribute this loss to the allergy. Her office is one where the air flow has generally been very poor. The circulation of air often diminishes in the afternoons and the situation is worse near the end of the week. While a direct causal connection has not been made between the allergy and the indoor air quality in this employee's office, there would seem to be a high probability for that connection.

The third person is located in the same general quadrant of the building as the second person and may or may not be serviced by the same air handling unit. Her office also is one that receives very poor air circulation. Although an original occupant of the building (in the building since the move

in 1980), within the past two years, this employee has experienced several acute respiratory illnesses, including a difficult-to-break chain of sinus infection, flu, bronchitis, and pneumonia. Prior to the onset of these illnesses, the employee was rarely sick. Her allergist has identified allergies to 10 molds and to dust and dust mites, all of which are found primarily inside buildings rather than in the outside environment. Again, the correlation between the indoor air quality in this employee's office and the onset of illnesses and allergies has not been verified but the likelihood of such a connection is high.

Comments on the Proposed Indoor Air Quality Act

A major concern of Library of Congress staff, whether they are located in the Madison Building or in any of the other Library buildings on Capitol Hill, is the extent to which they are covered by the provisions of the draft Act as they relate to Federal Buildings. Library of Congress buildings, along with many other legislative branch facilities on Capitol Hill, are under the jurisdiction of the Architect of the Capitol rather than under the General Services Administration (GSA). I believe that Library staff would like to ensure that they would benefit from the provisions of the legislation, equally with those persons who work in Federal Buildings under the GSA. Therefore, CREA urges that the Library of Congress be included under the legislation.

Consumer Federation of America

TESTIMONY OF

STEPHEN BROBECK

EXECUTIVE DIRECTOR

CONSUMER FEDERATION OF AMERICA

before the

SUBCOMMITTEE ON SUPERFUND, OCEAN AND WATER PROTECTION

OF THE SENATE COMMITTEE ON ENVIRONMENT

AND PUBLIC WORKS

on

S.657: "INDOOR AIR QUALITY ACT OF 1989"

May 3, 1989

1424 16th Street, N.W., Suite 604 • Washington, D.C. 20036 • (202) 387-6121

Mr. Chairman and Members of the Subcommittee, I am Stephen Brobeck, Executive Director of the Consumer Federation of America. CFA represents over 240 local, state and national organizations with a combined membership of 50 million people.

I want to thank you, Mr. Chairman and Members of the Subcommittee, for the opportunity to testify here today in support of S.657, the "Indoor Air Quality Act of 1989". I also want to thank you for your co-sponsorship of this bill and for your leadership in focusing the Senate's attention on radon. CFA strongly endorse S.657 as a measured, comprehensive approach to addressing indoor air quality and making it a national priority.

Indoor air quality is a key health and safety priority for CFA. For many years now, we have perceived indoor air pollution as the number one hidden health threat to our nation, where people are estimated to spend as much as 90% of their time indoors. CFA's concern is shared by the business community, as well as other consumer and health organizations. Earlier this year, The Coalition for Consumer Health and Safety, whose members include 13 consumer and health groups and 13 insurance companies and associations, released a comprehensive report entitled the "Consumer Health and Safety Agenda." Indoor air quality is one

of seven key issues identified in this agenda and I am pleased to submit a copy of this report for your hearing record.

Specifically, I call the Subcommittee's attention to the Coalition's support for S.1629, the Indoor Air Quality Act of 1987, essentially the same legislation being considered today (see page 35 of the Agenda). Like consumer and health groups, the insurer members of this coalition recognize the need for our government and others to develop a comprehensive strategy to combat indoor air problems. They recognize too that, if effective, such a strategy can begin to reduce the enormous health costs associated with poor interior air that are shared across all segments of our society.

While this nation has spent billions of dollars to improve the quality of outdoor air, until relatively recently, indoor air pollution has received little national attention. If this legislation is enacted and fully funded, it will cost the Treasury $48.5 million a year. Can such an expenditure be justified in an era of unprecedented federal deficits? We believe it is easy to do so, even in purely economic terms.

Several years ago, the Consumer Product Safety Commission (CPSC) estimated that indoor air pollution costs our nation as much as $100 billion a year in medical costs and lost days at work. Using the conventional economic estimate of a human life as worth $1 million, just the 5000-20,000 cancer deaths from radon each year, and the 3500-6500 cancer deaths from non-radon

indoor pollutants, would impose costs of roughly $8.5 to $26.5 billion on our society. Add to these costs the far greater human costs -- the pain and sorrow of the thousands who lose their loved ones and the millions who are incapacitated by pollutant-induced illness -- and the total tab for indoor pollution is monstrous. If this legislation were only to reduce these deaths by as little as 10% or even 5%, it would pay for itself many times over.

CFA believes that S.657 represents an important step toward elevating indoor air quality to the national priority it should be. The bill in fact represents a compromise in terms of a regulatory scheme. It does not establish enforceable standards nor does it afford new regulatory authority. Rather it recognizes the need for clear leadership - and <u>action</u> - by the Environmental Protection Agency. It provides the agency with both adequate resources and needed direction. S.657 expands and focuses current research efforts at EPA and significantly advances the dissemination of vital health information to the experts in the field and to the public - through its national response plan, contaminant health advisories and information clearinghouse. Importantly, it crafts a strategy to improve coordination among federal agencies with indoor air responsibilities and by creating a national council, signifies the relative importance of addressing indoor air quality.

Controlling indoor air pollution necessitates effective federal leadership. The public has looked to EPA; yet until the Superfund Amendments and Reauthorization Act (SARA), there were questions still being raised within EPA as to even its research authority for indoor air. S.657 now clarifies that EPA not only has the research authority for indoor air quality, but that it also has a mandate to act.

EPA is the logical designee as the lead agency for indoor air. It has the experience in complex regulation of air quality under the Clean Air Act, the capacity for consumer education, and research efforts underway in response to SARA. However, CFA believes that it is critical for EPA to work closely with other federal agencies having related interests and jurisdiction over indoor air problems to achieve a comprehensive response.

I would like to briefly offer the following comments on specific provisions of the bill:

* Section 6: Indoor Air Contaminant Health Advisories

CFA supports the concept of indoor air contaminant health advisories as set forth in Section 6. As we indicated earlier, this is a measured approach, developed in lieu of enforceable standards. The benefits of these advisories are two-fold: (1) they provide guidelines and important information to state and local officials in developing indoor air strategies and

facilitating public understanding, and (2) they direct EPA to set necessary priorities to develop action on known contaminants.

Risks from exposure to indoor air pollutants do need to be communicated and can be done without needlessly scaring the consumer. The public is capable of understanding risks from exposure and these health advisories are a reasonable means to that end. However, in addition to communicating when there is a problem, it is also important to communicate what to do, i.e. mitigation techniques. While the response plans mandated by section 7 of the bill must address measures to reduce exposure, we believe that whenever possible the health advisories should also include basic information on ways consumers can reduce their risk. The publication of health advisories will certainly create many questions in the minds of consumers, the first of which is what can I do to avoid this risk?

Integral to these advisories is the need for health-effects data. In addition to forcing EPA to produce these advisories, this provision should also force EPA to spend more time and resources on health based research. To this end, we would recommend that EPA be required to work directly with the Department of Health and Human Services for the development of epidemiological and human studies on the health effects of indoor air pollution.

* Section 11: Council on Indoor Air Quality

Indoor air quality responsibilities span at least eight key federal agencies. Coordination among these agencies for research and action -- outside of EPA -- is critical if we are to assure the most effective use of taxpayer dollars in this effort. We support the creation of this Council within the Executive Office of the President to ensure this coordination and the provision of adequate resources to carry through with its tasks. Further, the creation of this Council clearly identifies indoor air quality as a national priority and signals to the American public that it must begin to pay attention.

To assure adequate emphasis on health research, we would urge the inclusion of representatives from the specific health research institutes within the Department of Health and Human Services. We also recommend that a strong emphasis be placed on the relatively important role of those agencies concerned with controlling sources of indoor air pollutants, particularly the Consumer Product Safety Commission.

* Section 12: National Indoor Air Quality Clearinghouse

The proposed clearinghouse is an important aspect of this legislation. It is very hard to dispute the need to provide objective and consistent information to the consumer, to local, state and national agencies, to health professionals, to architects and builders, and to industry. The clearinghouse will

certainly serve that function. CFA is pleased to see that this provision requires the establishment of a "consumer hot-line". This service will help maximize the effectiveness of the clearinghouse by facilitating dissemination of non-technical information to consumers.

- Conclusion

While there is clearly far more work ahead in terms of research and the application of technology, S. 657 is a sound and reasoned approach to begin reducing exposures to indoor air pollutants -- in the home and in the work place. We strongly support this measure and urge its quick passage.

THE COALITION FOR CONSUMER HEALTH & SAFETY

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Alliance of American Insurers
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American College of Preventive Medicine
American Council of Life Insurance
Americans for Democratic Action
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American Public Health Association
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The Kemper Group
Liberty Mutual Insurance Group
Motor Voters
National Consumers League
National Council of Senior Citizens
Nationwide Insurance Company
The Principal Financial Group
The Prudential Insurance Company of America
Public Voice for Food and Health Policy
State Farm Insurance Company
The Union Labor Life Company

CONSUMER HEALTH & SAFETY AGENDA

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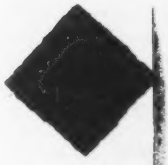
ASSESSMENT OF THE PROBLEM

With Americans spending up to 90 percent of their time indoors, they face a significant potential for exposure to harmful contaminants in the air indoors. This exposure to indoor air contaminants occurs in workplaces, schools, public buildings, residences, and automobiles. The concentration levels of many of these contaminants indoors may be many times greater than what they are outdoors.

Indoor air pollution has become a growing concern only in the past decade as Americans, in response to the energy crisis, began to seal up their homes and offices. Moreover, most office buildings, whether they have working or inoperable windows, rely on central heating and air conditioning systems for ventilation, and the exchange rate of polluted indoor air for possibly cleaner outdoor air has been reduced significantly. Reduced ventilation, while not the source of the indoor air pollution, has clearly exacerbated the problem. There is reduced ventilation in residential structures as well. A decade ago, the exchange rate for air in homes was once every hour; now, most homes have only one air exchange every two hours, with some newer, energy efficient homes having an exchange only once every five hours.

The pollutants in indoor air include radon, asbestos, volatile organic chemicals, combustion by-products, metals and gases, bacteria and other microorganisms. Tobacco smoke is also a factor in indoor air pollution (see discussion of passive smoking in the "Cigarette Consumption" section).



David Sucnkin
Consumer Federation of America
Alvin Parsons
American Insurance Association

INDOOR AIR QUALITY

Indoor air pollutants pose serious threats to public health. For some contaminants, such as carbon monoxide, a single high exposure can be toxic—even lethal. For others, such as radon or asbestos, the harm appears to come from prolonged exposure to the pollutant, and often does not become apparent for years. Long-term or chronic effects include cancer; respiratory ailments such as asthma, bronchitis, and emphysema; liver and kidney disease; and effects on the central nervous system or metabolic processes.

Little research has been done on many of the indoor air pollutants, and therefore no standards exist to determine what levels of exposure present a significant health threat.

EPA estimates that radon alone causes between 5000 and 20,000 lung cancer deaths each year. Other selected indoor air pollutants are estimated to cause between 3500 and 6500 additional cancer cases annually.

People who are exposed for the longest periods of time are often those most susceptible to the adverse effects of indoor air pollution—young children, the elderly, and those with pre-existing health problems, such as respiratory illnesses, angina or heart disease, vascular disease and immunological disorders. Moreover, the National Academy of Sciences estimates that up to 15 percent of the United States population may have heightened sensitivity to chemicals and related substances found in the air indoors.

Additionally, indoor air contamination is estimated to cause significant increases in medical costs and declines in work productivity. As many as 20 percent of all office workers may be exposed to environmental conditions manifested as "sick building syndrome." These workers experience physical symptoms (dry mucous membranes; eye, nose, and throat irritation; nausea; skin rashes; flu-like symptoms; drowsiness; inability to concentrate; memory loss; shortness of breath) that often improve after they leave the building.

Little research has been done on many of the indoor air pollutants, and therefore no standards exist to determine what levels of exposure present a significant health threat. Any standards that do exist have often been established only for short-term industrial exposures. In some circumstances—radon being the prime example—the government has stopped short of standards and has instead set only "guidelines."

The Superfund Amendments and Reauthorization Act of 1986 (SARA) included the first federal legislative recognition of the indoor air problem. Title IV of SARA, the Radon Gas and Indoor Air Quality Research Act, gave EPA an explicit mandate to conduct research and disseminate information on indoor air quality problems and solutions. Title IV also required EPA to report to Congress on its implementation plan for carrying out its responsibilities under the Act, its radon action program, its overall indoor air quality policy objectives, research and information dissemination plans, and recommendations for further action.

Other federal legislative initiatives have dealt with specific aspects of the indoor air quality problem. Congress has provided states with funds for asbestos assessment and abatement, particularly in schools, through the Asbestos Hazard Emergency Response Act (AHERA) and the Asbestos Hazard Abatement Act (ASHAA).

In October 1988, Congress enacted the State Radon Program Development Act of 1987 (Pub. L. No. 100-551), which provides states with technical and financial assistance for their radon programs. This comprehensive radon initiative requires EPA to undertake a number of activities relating to radon, such as conducting a survey of schools and federal buildings to determine the level of radon contamination; establishing an informational clearinghouse on radon; certifying radon measurement devices and mitigation technologies; and developing model construction standards and techniques to reduce radon levels. The new radon law also sets as a national goal an indoor radon level equal to the outdoor level (approximately 0.2 picocuries per liter). Additionally, it directs the EPA to better explain the health risks of various radon levels in its informational materials.

A number of states, including Maine and New Hampshire, have enacted their own indoor air quality programs.

CAUSES OF THE PROBLEM

Indoor air pollution is a complex problem because it can originate from a variety of sources. It is caused by an accumulation of contaminants that come primarily from inside of a building, although some, like radon, originate outdoors. The contamination may be generated by a single source or a combination of several sources over a wide area, either at a certain time or continuously.

Sources of indoor air pollution include those conventionally associated with outdoor air pollution, as well as building materials and furnishings, consumer and commercial products, combustion appliances, and indoor application of pesticides. Moreover, indoor air pollution problems can be aggravated—or even caused—by improperly designed or maintained ventilation systems.

Radon

Radon is a colorless, odorless radioactive gas, produced by the decay of uranium, which exists naturally in soil, rock, and groundwater. It can also be found in certain building materials such as concrete or brick made from contaminated rock or clay, and especially in granite. The amount of radon present in soil varies widely. Certain areas of the country may have larger deposits of radon, although high radon levels have been found in all 50 states. Radon levels appear to be related not only to geography, but also soil permeability and house structure. More than 25 percent of the houses tested in a recent EPA radon survey had radon levels above four picocuries per liter of air, the level at which the EPA recommends that mitigation action be taken.

Because radon is a gas, it can easily seep from the soil or rock into the house through cracks and holes in the foundation and crawl spaces. It can also be carried into the house by ground water or well water. Radon gas quickly breaks down, forming radon progeny which in turn decay and emit harmful radiation. Inside, these materials attach themselves to particles in the air and are inhaled. In the body, the radiation causes irritation and damage to lung tissue. As indicated above, EPA estimates that 5000–20,000 lung cancer deaths a year in the United States may be attributed to radon. The EPA and the Surgeon General issued a joint health advisory in September 1988 in which they urged that all houses be tested for the presence of radon.

More than 25 percent of the houses tested in a recent EPA radon survey had radon levels above four picocuries per liter of air, the level at which EPA recommends that mitigation action be taken.

Asbestos

Asbestos is a generic term for a number of naturally occurring mineral fibers. Asbestos was used in home insulation, fireproofing materials, tiles, plaster, and wallboard because of its high resistance to heat and chemical abrasion. Asbestos fibers never break down, so when they are disturbed they are released into the air where they remain indefinitely. If inhaled, they remain in the lungs as a permanent irritant. The adverse effects of asbestos exposure—asbestosis, lung cancer, mesothelioma (cancer of the abdominal and chest cavity lining)—have been documented in the worker population.

Crumbling plaster, tiles, or pipe insulation can release asbestos into indoor air, as can the process of renovating or repairing an older home or office building. Several asbestos products have been banned, and some manufacturers have voluntarily limited uses of asbestos. However, it is still found in numerous consumer products, which must be labeled as containing asbestos if they are likely to release the substance in the course of use.

Combustion By-products

Nitrogen dioxide, carbon monoxide, carbon dioxide, and sulphur dioxide are all emitted by combustion processes. Both carbon monoxide and dioxide can achieve dangerous levels indoors due to unvented, poorly vented, or improperly operated or maintained wood stoves, kerosene heaters, fireplaces, furnaces, or gas appliances. A person suffering from carbon monoxide poisoning experiences flu-like symptoms, and exposure at very high concentrations can be fatal. Nitrogen dioxide can irritate mucous membranes, impair lung function, and increase the risk of respiratory infection in young children.

Organic Chemical Compounds

Scientists know relatively little about the potential toxicity of the thousands of organic chemical com-

pounds found in home products such as cleaning agents (oven cleaners, furniture and floor polishes, chlorine bleach, and laundry products) as well as in paints and paint removers, disinfectants, deodorizers, pesticides, cosmetics, glues, craft and hobby materials, and carpet and furniture care products. Home furnishings—polyester and polyvinylic curtains and drapes, synthetic carpet materials and floor tiles, even polyester clothing and plastic soda bottles—can also contribute to organic chemical compound pollution in indoor air. Organic airborne compounds that may be emitted from these materials include formaldehyde and other aldehydes, vinyl chloride, benzene, perchloroethylene, and paradichlorobenzene.

Airborne bacteria, viruses, allergens, and fungi are frequently found in indoor air and may represent a significant health threat.

Formaldehyde, a chemical that acts as both a binder and a preservative, is used in numerous consumer products. It is also a by-product of combustion and other natural processes. Long recognized as an irritant to eyes, skin, nose and throat and the cause of nausea, headaches, and lethargy, formaldehyde has been identified as a probable human carcinogen by the EPA.

Concern regarding formaldehyde was first raised in the 1970's, when urea-formaldehyde foam insulation (UFFI) was used by many consumers. UFFI was used until it was shown that homes had high concentrations of formaldehyde soon after installation. Particleboard, hardwood plywood, and medium density fiberboard are three types of pressed wood products that use a urea-formaldehyde resin. Since 1985, the Department of Housing and Urban Development has set emission limits for formaldehyde in plywood and particleboard used in prefabricated and mobile homes. Pressed wood products in general are presently subject only to voluntary standards.

Another organic chemical compound, methylene chloride, is a multi-purpose solvent used in paint strippers and aerosol products. Methylene chloride has long been associated with central nervous system disorders, and more recently has been identified as posing a cancer risk. There are no standards governing methylene chloride, although warning labels are required on some consumer products containing this substance.

Biological Contaminants

Airborne bacteria, viruses, allergens, and fungi are frequently found in indoor air and may represent a significant health threat. In 1987, bacterial and viral infections were the sixth leading cause of death in the U.S. Microorganisms carry infectious diseases such as influenza, tuberculosis, measles, and Legionnaire's disease. Some biological contaminants can also trigger allergic reactions, while others, such as fungi, release disease-causing toxins. A recent study done by scientists at EPA revealed that ultrasonic humidifiers can be the source of biological contamination. When these humidifiers are not properly cleaned, they can release mold and bacteria into the air.

GENERAL APPROACHES TO SOLVING THE PROBLEM

Indoor air pollution is a relatively new public health concern, and as such, presents interested parties the opportunity to be involved in the initial development of a comprehensive strategy for alleviating this serious health threat.

On the federal level, the Congress must go beyond SARA to support a more expansive research effort to assess the seriousness and extent of indoor air contamination, to identify the health effects of indoor air contamination, and to develop diagnostic methods, protocols, and control technologies, education programs, and other methods of reducing human exposure to such contamination.

The relevant federal agencies must develop response plans to reduce human exposure to indoor air contaminants and must work together to improve coordination of their indoor air activities.

State governments can make significant contributions to the effective reduction of human exposure to indoor air contaminants, through their own legislative initiatives and public education programs. The federal government can assist the states through the technical expertise of agencies like the EPA, and through grants to help support indoor air quality research and pro-

gram development. In developing such programs, particular focus should be placed on ways to assist low-income citizens who may not be able to afford measures to mitigate indoor air pollution problems. Additionally, state and local building code provisions could be a useful tool to ensure acceptable indoor air quality in all residential and commercial structures.

Voluntary standards organizations should work to develop consensus standards for appropriate testing methods to measure indoor air quality, and standard protocols for investigating "sick" buildings.

The building industry—residential and commercial builders, architects, lenders, insurers, product manufacturers, building owners and managers—should be encouraged to incorporate the best known technologies to avoid indoor air quality problems in the first instance, and to mitigate their adverse consequences where avoidance is impossible.

Consumer and other public interest groups, the environmental community, the media, and educators at all levels should work to keep the public aware of indoor air quality problems and solutions, and to inform the public of self-help steps that can be taken to control indoor air quality problems at their source, where possible, and to mitigate them where they cannot be eliminated. Information clearinghouses dealing with various aspects of the indoor air pollution problem could play an important role in ensuring timely transfer of appropriate information to consumers, the building community, and the research community.

SPECIFIC RECOMMENDATIONS

The Coalition supports a comprehensive examination of indoor air pollution. A legislative initiative containing key features of S. 1629, the Indoor Air Quality Act of 1987 introduced in the 100th Congress, represents a sound approach for implementing such an examination. The legislative provisions that the Coalition endorses include:

- further research on indoor air pollution exposure levels, health effects, sources, diagnostic and mitigation techniques;
- establishment of a program to demonstrate various technologies that may contribute to the reduction of indoor air contamination;
- delineation of EPA as the lead agency in the area of indoor air pollution and greater coordination among all relevant agencies in their indoor air activities;
- grants to state indoor air quality programs;
- establishment of a National Indoor Air Quality Information Clearinghouse that would serve to exchange information on technologies and methods to minimize exposure to indoor air contaminants; and
- development of a program to demonstrate methods of assessing and mitigating indoor air contamination in both public and private facilities.

State and local building code provisions could be a useful tool to ensure acceptable indoor air quality in all residential and commercial structures.

The Coalition urges the relevant federal agencies, in particular EPA and the Consumer Product Safety Commission (CPSC), to continue their research efforts on indoor air pollution and, if necessary, consider the adoption of standards for particular indoor air pollutants, such as formaldehyde, under existing statutory authority. The CPSC should continue to investigate products that contribute to indoor air pollution, such as kerosene heaters and ultrasonic humidifiers, and develop product standards where appropriate.

Additionally, the Coalition supports the development and implementation of model building codes for various types of buildings designed to reduce the levels of indoor air contaminants.

The Coalition also advocates the adoption of measures to combat fraud in, and ensure the reliability of, the diagnosis and mitigation of indoor air problems. These measures could include greater public education, consumer complaint mechanisms, and certification of laboratories and firms offering indoor air testing and remedial services.

The Coalition supports development of an extensive public education campaign to inform consumers about indoor air pollution and what they can do to alleviate it.

STATEMENT

TO THE

SENATE COMMITTEE

ON

ENVIRONMENT AND PUBLIC WORKS

SUBCOMMITTEE

ON

SUPERFUND, OCEAN AND WATER PROTECTION

REGARDING

THE INDOOR AIR QUALITY ACT

S.657

SUBMITTED BY:

THE BUILDING OWNERS AND MANAGERS ASSOCIATION INTERNATIONAL

MAY 3, 1989

Indoor Air Quality Testimony before the Senate Committee on Environment and Public Works Subcommittee on Superfund, Ocean and Water Protection
Wednesday, May 3, 1989
10:00 am. in 406 Dirksen Senate Office Building

Mr. Chairman, members of the Subcommittee, I am Allan S. Bisk, Executive Vice President, Rose Associates Inc. and Chairman, National Advisory Council with the Building Owners and Managers Association (BOMA) International. I would like to begin my testimony by commending you and your subcommittee for scheduling this hearing on indoor air quality legislation, specifically The Indoor Air Quality Act, S. 657. BOMA supports and shares your concern that a comprehensive and coordinated program of research and development is needed if we are to identify the nature, cause and extent of indoor air contaminants and reduce the effect they may have on human health.

The success of any building owner or manager is predicated on their ability to provide safe, healthy buildings and workplace environments. BOMA is committed to research on indoor air contaminants and will continue to take the lead in identifying solutions.

Founded in 1907, BOMA is the oldest and largest trade association

representing the office building industry, with 100 Federated Associations in the United States, Canada, and around the world. We have 7200 members who are office building developers, owners, managers, service companies, brokers and investors, who own or manage 5 billion square feet of office space in North America. Approximately 60 percent of our members are property managers, the remaining 40 percent are owners of commercial property.

In efforts to comply with legislated energy conservation guidelines and to lower energy costs, building managers have resorted to tightening buildings, and shutting down air conditioning systems at night and on weekends. To save energy, automatic temperature controllers are often used to cycle fans on and off during the day. In other energy conservation efforts HVAC systems designers have specified the installation of variable air volume (VAV) air systems. Attempts to save energy through the redesign of HVAC systems have made important contributions toward saving global energy supplies.

But these mandated efforts have not been without consequences. Shutting down air conditioning systems at night and on weekends may result in Monday morning complaints of building odors. Without proper maintenance, vibrations from the start-up of cycle fans may cause dirt to be dislodged and carried into occupied areas. In some instances VAV systems have permitted the introduction of stale air into an occupied space. When supply

fans are throttled back for energy savings, exhaust fans may not be reduced at the same rate. The exhaust fan may force more air into the "returnair/freshair" mixing box than the supply fan can accommodate. This may cause the return air to exhaust out of the building through the fresh air intake creating a situation where fresh air is prevented from entering the building through the HVAC system.

Concerns with the consequences of our energy conservation efforts led BOMA International to join with other industry groups under the auspices of the United States National Research Council's Building Research Board in designing a guideline entitled "Policies and Procedures for Control of Indoor Air Quality."

In addition, BOMA and the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE), cosponsored a study by scientists from the Georgia Institute of Technology, which involved an examination of three office buildings.

One building was built by a developer with concern for hyperallergenic occupants. "Natural" construction and finish products were incorporated in the building's design. Smoking in the building is prohibited. Ventilation systems have been designed to provide maximum opportunity to expel pollutants that may come from business equipment.

The other buildings were designed and constructed using routinely specified construction, finish materials and products. Smoking is not prohibited. Ventilation systems have been designed using standard design criteria.

Among other things, the researchers sought to determine whether or not there were significant differences in the levels of indoor air pollutants in the three facilities. Their findings indicated that the more acceptable indoor environment was found in the specially designed building.

In 1987, BOMA participated, along with scientists from 35 countries, in the United Nations World Health Organization's (UNWHO) sponsored "Indoor Air '87" conference in Berlin. Last year Douglas A. Greenaway, BOMA International's Vice President for Government Affairs was invited to present a paper on behalf of our industry at the joint United Nations World Health Organization (UNWHO)/Consiel International de Batiment (CIB) conference on "Healthy Buildings" in Stockholm. BOMA International is pleased to cosponsor along with the United Nations World Health Organization, Environment Canada, and the U.S. EPA "Indoor Air '90" which will be held in Toronto, Canada, July 29 - August 3, 1990.

Last year, BOMA, along with our colleagues in the Real Estate

Industry Working Group, (made up of members and staff from the National Realty Committee, the Mortgage Bankers Association, the International Council of Shopping Centers and the National Association of Realtors) worked closely with the Senate Environment and Public Works Committee to refine this bill's predecessor, S. 1629 while upholding the goals of the legislation. The Senate Environment Committee unanimously approved the measure, incorporating many of our suggestions and comments. I am pleased that this legislation reflects many of these same suggestions and comments.

BOMA was instrumental in organizing the Working Group as a way to provide a vehicle for examining environmental questions which impact upon the commercial office building industry. Our goal is to share information and build a consensus approach to these sensitive and critical issues.

Before I share with the subcommittee a description of BOMA's perspective on S.657, I would like to touch upon two important points relative to indoor air quality legislation. First, I strongly urge this subcommittee to pursue an objective discussion of the causes of indoor air problems. Where building related indoor air problems exist they are often sensationalized by misappropriated labels such as "sick building syndrome." The value of rational solutions has been diminished. In many instances indoor air problems can be directly traced to specific

sources such as heating, ventilating and air-conditioning (HVAC) systems, tobacco smoke, carbon monoxide, ceiling tiles, wall paper, carpets, furniture, flush toilets, humidifiers, pressed wood products, textiles or insulation. More often than not, correction of an air quality problem can be addressed by simply replacing a building component or readdressing a maintenance issue such as opening outside air dampers that may have been sealed shut as energy conservation measures.

Research indicates that serious air quality problems are relatively rare in multi-tenant commercial office buildings and that they are more frequent among single tenant buildings. Research also suggests that problems are rare in small buildings and unusual in buildings where there are windows in every workstation. Buildings which experience air quality problems are the exception, not the rule. Where complaints exist, they may be attributable to discomforting temperature or humidity levels, objectionable odors or poor air circulation. Some of these are within the capability and resources of the building owner and manager to address. Many general working conditions which affect an employee's level of workplace satisfaction are beyond the purview of the owner or manager but the responsibility of tenants, design professionals, contractors and others.

Employee smoking habits resulting in discomfort to non-smokers may suggest the need for tenants to address office-wide smoking

policies. Nevertheless, some of our members who occupy all or large portions of their own facility have adopted restricted smoking guidelines or outright bans on smoking in the workplace.

In some tenant spaces- tenant furnishing and occupant densities can become a primary source of contamination. Where occupant densities exceed a ventilation system's design capacity, complaints are bound to result from activities such as smoking or eating in the workplace. This may be combined with general feelings of stuffiness and warmth due in part to the close proximity to one's colleagues. Clearly, tenant solutions may include restrictive smoking policies, an evaluation of their interior space plan and perhaps a reconfiguration of that plan.

For the building manager, steps to improve thermal comfort and to increase minimum levels of outside air may be useful in reducing air quality complaints. Revised operational practices, though they may result in increased energy consumption, may prove a wise decision.

For most existing buildings BOMA suggests these few easy steps which can be taken to avoid indoor air quality problems:

- an alert building management educated and oriented to sensitive issues such as indoor air quality;

- effective and responsive communication between building management and tenants;

- engineering staff trained to deal with IAQ related issues;

- maintaining adequate levels of outside air;

- maintaining comfortable temperature and humidity standards;

- ensuring acceptable air movement;

- working with tenants to avoid occupancy densities in excess of a building's HVAC system design capacity;

- working with tenants to establish effective, practical smoking policies;

- ensuring that adequate attention is given to correct building systems maintenance and operational procedures.

Whatever the case, BOMA is committed to a healthy and safe workplace environment. Without these ingredients, we could not keep our facilities leased. Providing quality indoor air goes

hand in hand with satisfying our tenants.

A second point I would like to make addresses the regulatory nature of S.657. It is BOMA's position that such measures effectively create a regulatory program. This program would include the listing of indoor air contaminants, the publication of health advisories with concentration levels, Environmental Protection Agency (EPA) supporting actions which will result in the development of regulations, grants to states to develop regulations, building assessment recommendations and measures to reduce pollutant concentration levels.

Nevertheless I am pleased that you and your colleagues have gone a long way toward providing legislative guidance to the EPA. I urge you to examine carefully standards for listing contaminants and defining safe levels of concentration; establishing responses to contaminant concentrations and providing requirements for adequate public notice and comment.

BOMA is particularly concerned that the nation avoid the health, safety, public relations and economic debacle which has characterized the asbestos crises since the early 1980's. The transformation of the public's perception of asbestos from miraculous fire retardant to potentially dangerous carcinogen has dramatically altered the way buildings are managed, marketed, leased and sold. The irrational panic which has gripped the real

estate marketplace and was fueled by inappropriate public pronouncements about the presence of asbestos in buildings by federal authorities has led to requests for purchase discounts and efforts to decrease property values.

It is incumbent that information developed in containment lists, health advisories, technical and management bulletins be developed and disseminated in a sensitive manner so as not to replicate the unreasoned fears associated with asbestos in buildings. To this end, BOMA urges the committee to develop language which will allow for the concurrent publication of health advisories, technical and management bulletins.

While I believe it is S.647's intent, I urge you to clarify language that provides for 90 day public notice and comment not only for health advisories but also technology and management bulletins.

BOMA is concerned that in publishing a list of contaminants, that such a list clearly set forth the risks associated with a contaminant at exposure levels down to zero and that where feasible, there be some relationship drawn between risks of exposure to contaminants and risks associated with everyday occurrences. Furthermore, the EPA should clearly indicate when anticipated health effects from low concentrations of indoor air contaminants are extrapolations of health effects from higher

concentrations.

Finally, I urge the Chairman and the members of the committee to consider guidance to the EPA in the establishment of priorities for the development of advisories and bulletins particularly for those contaminants where building owners and managers are working to remedy a problem.

BOMA is supportive of S.657, The Indoor Air Quality Act of 1989. We are particularly pleased with the inclusion of the following provisions:

* the publication of technology and management practice bulletins, including assessments of the effectiveness, feasibility and cost of technologies for control and measurement of indoor air contaminants. Interest groups (like BOMA) with expertise in building management and related fields would have an opportunity to participate in the development of these bulletins;

* clarification and strengthening of the requirements for public review and comment on various documents provided for in the bill;

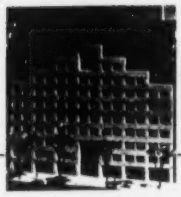
* requirements that the EPA use the latest available scientific information and research in preparing health advisories for indoor air contaminants, and requirements for

periodic review, revision and republication of health advisories.

* shortening of the National Institute of Occupational Safety and Health's (NIOSH) preliminary and final building assessment report times to 6 months each;

* the definition of occupants to mean employees, tenants, and employees of tenants and their authorized representatives.

In conclusion, BOMA welcomes the opportunity to work with this subcommittee in fashioning a coordinated program of indoor air quality research. To that end, we look forward to continued dialogue with you and your staffs and hope you will call upon our expertise as building owners and managers of commercial office buildings. We recognize our responsibility to be a part of the solution and provide quality indoor environments for our employees, our tenants and their employees. Thank you.



AMERICAN FEDERATION OF GOVERNMENT EMPLOYEES

AFFILIATED WITH THE AFL-CIO

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IN REPLY PLEASE REFER TO

STATEMENT BY

DAVID J. SCHLEIN

NATIONAL VICE PRESIDENT

AFGE, DISTRICT 14

on

BILL S. 657

INDOOR AIR QUALITY ACT

MAY 3, 1989

TO DO FOR ALL THAT WHICH NONE CAN DO FOR ONESELF

Mr. Chairman and members of the Committee:

On behalf of the American Federation of Government Employees I want to thank you for the opportunity to speak to you about Senate Bill 657. AFGE represents approximately 700,000 Federal and District of Columbia workers. I have the privilege of serving as the National Vice President for District 14 which represents approximately 50,000 D.C. and Federal workers in the Washington Metropolitan area. AFGE is pleased to support, in principle, S. 657. We believe it is an important recognition of indoor air quality problems. Although we do have some specific reservations which I will discuss shortly, we hope our comments will help make a good bill even better.

If you would have asked me a year ago if indoor air pollution was a significant health risk to Federal and D.C. workers, I would have asked indoor what? However, after I was elected to office last May that situation changed dramatically as I became involved in serious indoor air quality cases affecting our members working at the U.S. Information Agency (USIA), the Environmental Protection Agency (EPA) and the Office of Housing and Urban Development (HUD) In the past year I have seen a grass roots cry throughout government demanding attention to be paid to indoor air pollution.

Government employees should not have to place their health at risk each time they enter their work site. But many do. Office buildings were once considered a workplace safe from the tragedy of industrial mishaps and hazards. This is no longer the case. Poor

indoor air quality and "sick building syndrome" have created a modern occupational hazard for today's office worker. I have come to know first hand the devastation that occurs in the lives of the victims of indoor air pollution. In many cases, their careers are ruined along with their health. Since most physicians know nothing about indoor air contamination and the administrators of the Federal Employees Compensation Act (FECA) still cling to the fiction that chemical diseases are compensable only if caused by a simple agent (like benzene or asbestos), employees have great difficulty in obtaining workers' compensation benefits. With indoor air pollution, workers are subject to multiple exposure from a list of substances such as formaldehyde, pesticides, carbon monoxide, solvent fumes and off gasses from paints, rugs and furnishings.

Just two months ago, as part of the Safe Workplace Air Coalition, our union released the preliminary results of a survey of Federal and Washington, D.C. government employees. Almost 75 percent of the 1000 respondents believed poor indoor air quality was a serious problem in their workplace.

More than 90 percent reported experiencing physical symptoms often associated with poor indoor air quality. The maladies reported ranged from sneezing, coughing and sinus congestion to serious respiratory illnesses. Most of the symptoms dissipated when the worker left his or her office building; a clear indication of sick building syndrome-related illness.

Our survey is indicative that there is a serious cost to the

government in not addressing these problems. These costs result from increased use of sick leave, decreased productivity, health care and workers' compensation cost. S. 657 should direct government agencies to quantify these costs and estimate the savings if corrective measures are taken.

The dramatic results of our survey and two recent well-publicized indoor air quality problems at the EPA and USIA headquarters have convinced us that there is a serious and growing problem in government buildings. This is what makes the efforts of the Majority Leader and his 18 co-sponsors on S. 657 so important.

Experts who have studied indoor air quality including the national Academy of Sciences and a number of private analysis firms agree that poor indoor air quality is most often a result of inadequate or improper ventilation. The lack of proper ventilation and air filtration can contribute to the growth and distribution of viruses, fungi and toxic vapors.

Not surprisingly then, government employees are even more susceptible than many other workers to the hazards of poor indoor air quality. Too many government managers attempt to cut costs by shutting down ventilation systems and purchasing inferior office materials which emit dangerous chemicals. In addition, workers are crowded into small work spaces, limiting the amount of fresh air each worker breathes.

Before turning to specifics, let me comment that in general occupational health problems have three parameters: all of which, we

believe are equally important: research, prevention, and compensation. Research seeks new knowledge about the problem, prevention applies the results of research to improve the workplace, and compensation pays for the victims for whom research and prevention came too late.

While the search for new knowledge about the causes and health effects of IAQ are laudable, we would like to see S.657 present a more balanced approach to the problem with equal emphasis on the three issues of research, remediation, and compensation for victims.

Toward that end, we would recommend that the emphasis, and the funding in the bill be adequately apportioned among these three activities. The search for solutions should take place along with the application of existing knowledge to remedy buildings already known to be causing human sickness. These activities must be complemented by efforts from the compensation and rehabilitation systems to find creative solutions to employ sick and chemically sensitized workers, and speedily and adequately compensate those that cannot be rehabilitated.

We believe that Congress should act in this legislation to make the Federal Government a model employer, setting the pace for the rest of the nation in addressing, and correcting indoor air quality problems. A national Federal building indoor air quality survey of employees should be conducted as a priority item, with the results of the survey used to designate the sickest buildings within each Federal Region. While the research continues, the clean up should

begin. To that end, we believe that S. 657 should be amended to require an extensive program of demonstration projects in Federal buildings not only in Washington D.C. but around the country within the next two years. Based on our experience we call on projects to begin at USIA, HUD, DOL, Census Bureau, HHS at Parklawn, Defense Mapping and EPA.

To provide leadership and accountability for this Federal Agency effort, I would suggest that Section 8 (a) of the present Bill be changed so that an interagency Federal Indoor Air Quality Council is created and charged with the responsibility for carrying out these activities. This council should include, not only GSA, EPA, NIOSH, and OSHA, but also equal representation from the major Federal employee unions including, but not limited to, AFGE, AFSCME, and the Postal Workers. We further recommend that either OSHA or EPA chair this committee in lieu of the present Bill's designation of EPA and GSA as the co-chairs. While regrettable, it is true that none of the Federal agencies with responsibility for indoor air quality have thus far distinguished themselves.

EPA has tragically underplayed and all but ignored the plight of over 100 of its employees, including some of the agency's top scientists and toxicologists, who became ill because of off gassing

from newly installed carpets. OSHA and NIOSH have treated the issue of indoor air quality with benign neglect. Their combined efforts in this area can best be summed up in one word: underwhelming.

But GSA, the nation's landlord, has had such a singularly bad record in this area that we seriously question the advisability of giving GSA a share in the leadership role for administering the Federal government's indoor air quality program.

GSA's policies, all too often, have directly led to indoor air quality problems, or once problems surfaced, have resulted in avoidance of responsibility and stonewalling. Three dramatic examples of indoor air pollution have recently demonstrated GSA's unwillingness to address the IAQ problem.

* In early 1988, workers at the Environmental Protection Agency headquarters began to suffer physical ailments after their building had been remodeled and new carpet and partitions were installed. One employee became so ill she had to take a leave of absence and eventually had to be moved to a work station outside her sick building. Several employees can no longer enter the building. Finally, the carpet was replaced but the ventilation system -- probably the real culprit -- was not corrected or even adequately tested.

* Employees in U.S. Information Agency have complained or poor indoor air-related symptoms for more than a year. Preliminary studies revealed a serious indoor air quality problem in the USIA

headquarters. To date, no action has been taken. In fact, GSA has refused to proceed with tests in the headquarters building because they claim that the company that owns the building will not give its approval. This is a clear abdication of important responsibilities by GSA.

In both cases, affected employees and their union representatives were forced to picket and take their story to the media before GSA even responded. Even after these episodes, GSA has been reluctant to admit that there is a widespread and growing problem in Federal buildings.

* One of the most shocking examples of GSA's mismanagement of the indoor air quality issue occurred in the HUD building. I understand that last summer HUD was given a rate break by PEPCO if they cut down on their energy use. As a result, HUD officials decided to severely curtail the use of the air conditioning and ventilation systems. Not surprisingly, air conditioning was still provided to the offices of the political appointees meaning that in other areas of the building the system had to be completely shut down to reach the energy use reduction goals. One HUD attorney reported significant weight loss during the summer because he worked past five in the afternoon and on Saturdays when there was no air conditioning or ventilation at all.

Mr. Chairman, placing GSA in charge of the Federal indoor air quality program is like asking the fox to guard the hen house. Time

and again, GSA has shirked its responsibility to provide employees a safe and clean workplace. GSA has made it clear that they are more interested in cutting costs than in protecting the thousands of government employees threatened by their working conditions.

GSA's most recent strategy has been to shift responsibility to either the agencies or a private building owner. GSA then refuses to act on employee complaints because they claim they don't control the building. To alleviate this problem, we recommend that the bill include a provision requiring all GSA leases to contain a provision for regular IAQ testing and monitoring. The Bill should also provide that all test questionnaires, raw data, and survey must be made available to unions representing employees and the public.

Because of GSA's long record of opposing health and safety measures, we strongly recommend that the Federal occupational safety and health unit of OSHA be given responsibility for a testing program in Federal buildings. OSHA understands this issue and the importance of the threat poor IAQ poses to the health of government workers. They also know how to respond to employee complaints and correct problems. GSA is simply not willing or able to do this. However, because of recent OSHA budget cuts and shifting priorities, this part of OSHA, which once had 23 staffers, now has only 7 full time professionals. OSHA will have to address the resource issue of

the agency if it is to have a credible role in this program.

Because of OSHA's long-time and well-recognized expertise in occupational safety and health issues, we also recommend that jurisdiction for the elements of the bill that deal with workplace IAQ be shifted from EPA to OSHA. OSHA has a mandate to provide every working man and woman in this country, in so far as possible, with a safe and healthy workplace. It is time that responsibility includes not only factories, foundaries and construction sites, but also offices where 50% of employees now work.

OSHA officials, however, should be asked to demonstrate to the Committee how it would allocate resources in order to meet the new responsibilities of this Act. Currently, the Office of Federal Agency Programs (OFAP) has only 7 professionals and 11 vacancies. As the agency charged with enforcing workplace health and safety regulations, OSHA should have the ability and resources to protect workers from this latest threat.

Similarly, in Section 9 of the bill, we are concerned that the state agencies given Federal IAQ grants be prepared to address the IAQ concerns of workers. Only with the participation of state and local OSHA offices can we be assured that state programs which specifically protect workers will be supported.

I would like to add here that I strongly support the intent of Section 9 to promote and assist state and local IAQ management programs. AFGE represents several thousand District of Columbia

employees and from their responses to our survey, I know there are serious problems in many D.C. buildings. I hope that the District is classified as a state under Section 9 and will be eligible to participate in the IAQ program. In addition, we represent DOL employees who work in the GAO building, and Government Printing Office (GPO) employees both of which are legislative branch buildings. Since IAQ problems do not respect the neat separation of powers outlined in our nation's constitution, we suggest that the bill specifically include facilities under control of the legislative branch within the scope of its mandate.

We at the American Federation of Government Employees are doing all we can to secure our right to a safe and healthy workplace for all workers we represent. We are working hard to assist those whose health, lives, and livelihood have been disrupted by IAQ diseases to obtain workers' compensation and or job restructuring through provisions of the Rehabilitation Act of 1973 that require agencies to try and accommodate the special needs of handicapped workers. We appreciate your concern and interest in the welfare of Federal and D.C. workers.

I commend the Chairman and the Committee for the work they are doing. I am confident that if we work together we can make significant progress in dealing with this important issue. I will be glad to answer any questions.

bc ia
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TESTIMONY OF PAUL A. CAMMER, Ph.D.

PRESIDENT, BUSINESS COUNCIL ON INDOOR AIR

BEFORE THE

SUBCOMMITTEE ON SUPERFUND, OCEAN, AND WATER PROTECTION

OF THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE

REGARDING S. 657

INDOOR AIR QUALITY ACT OF 1989

May 3, 1989

Paul A. Cammer, Ph.D.
President

TESTIMONY OF PAUL A. CAMMER, Ph.D.
PRESIDENT, BUSINESS COUNCIL ON INDOOR AIR
BEFORE THE
SUBCOMMITTEE ON SUPERFUND, OCEAN, AND WATER PROTECTION
OF THE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE
REGARDING S. 657
INDOOR AIR QUALITY ACT OF 1989

MAY 3, 1989

Good morning. My name is Dr. Paul A. Cammer, President of the Business Council on Indoor Air (BCIA). I am pleased to be here this morning to present BCIA's views regarding the Indoor Air Quality Act of 1989 (S. 657).

BCIA represents a wide spectrum of industries interested in indoor air quality. Our membership is composed of firms with analytical and engineering expertise in monitoring, controlling, and improving the quality of the indoor environment and manufacturers of chemicals, consumer products, and building materials.

BCIA agrees with Senate Majority Leader George Mitchell and the other sponsors of this legislation that protecting indoor air quality is of primary importance and that EPA resources should be directed to identifying

indoor air quality problems and finding the most efficient methods to remedy those problems.

Our principal comments on S. 657 fall into two main categories: comments on the research aspects of the Bill and comments on the potential regulatory implications of the Bill.

We fully agree that further research activities regarding indoor air quality are needed and that these activities must be coordinated. We believe, however, that research efforts should be prioritized and focused, so that the most promising steps to protect and improve indoor air quality can be identified, evaluated, and implemented.

We do have concerns about the potential regulatory implications of the legislation, however. In particular, we believe that the listing of contaminants and the "health advisories" called for in Section 6 and the regulatory action requirements in Section 7 should be reconsidered.

I will address each of these points in turn.

A. Indoor Air Quality Research

Research directed to improve indoor air quality is sorely needed and must be coordinated among the participating agencies. EPA's Report to Congress entitled the "EPA Indoor Air Quality Implementation Plan," submitted in June 1987, contained EPA's near-term implementation plan for indoor air quality research. EPA is currently preparing final recommendations in a Report to Congress required by Title IV of the Superfund Amendments and Reauthorization Act of 1986. We look forward to reviewing EPA's recommendations when they are released.

It is essential that the many research programs now underway and those planned for the near future be coordinated to provide the most valuable information for improving indoor air quality. Part of that coordination effort requires the setting of realistic priorities so that the limited federal funds that are available can be used in the most efficient way possible. In our comments to EPA's Science Advisory Board on the Research Needs section of EPA's draft Report to Congress, we urged that criteria be adopted for setting priorities based upon sound scientific principles and that those criteria be applied in such a way

that the projects yielding the most timely and useful information will be funded first.

We believe that the following criteria should be used in establishing priorities for indoor air quality research:

1. While BCIA recognizes that not all indoor air quality problems can be avoided through improved maintenance and design of building systems, it is clear that a majority of potential indoor air quality problems can be prevented and existing problems remedied in a cost-effective way through such an approach. Because there are relatively few sources of indoor air contamination which cannot be reduced, if not eliminated, through proper design and management of heating, ventilation, filtration, and air conditioning systems, we believe S. 657 should be revised to place the highest priority on research in the area of building systems technology.

2. Both risk assessment and exposure assessment research on a source-by-source or pollutant-by-pollutant basis should be undertaken only after (a) it

has been determined that the building systems approach will not adequately address the problem and (b) a risk assessment framework for the evaluation of simultaneous exposures to multiple indoor air contaminants from multiple sources has been validated to reflect actual human risk in changing indoor environments. Because of the extreme complexity of evaluating simultaneous exposures to mixtures of contaminants, we do not regard source-by-source or pollutant-by-pollutant risk and exposure assessment research in this context as a cost-effective approach to improving indoor air quality in general.

3. Research that can be conducted in cooperation with the private sector should be given high priority. Such research will promote (a) non-adversarial partnerships between government and industry, (b) development of and access to highly advanced technology, and (c) credibility in project planning, implementation, analysis, and interpretation.

Clearly the most important and cost-effective step toward preventing, mitigating, or eliminating health risks in indoor air is improvement of building ventilation and

filtration rates. Because a source-by-source or pollutant-by-pollutant approach is fraught with scientific problems and uncertainties, it is clear that research funds should be directed first toward strategies that have been demonstrated to provide practical, effective, and permanent solutions. Improvement of ventilation and filtration rates is one such strategy. The American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), a standards-setting group that develops voluntary consensus guidelines for building contractors, has recognized the importance of higher ventilation rates in improving overall indoor air quality. In the near future, ASHRAE will revise its building code guideline for ventilation rates by increasing the existing base minimum rate of 5 cfm/person (cubic feet of air per minute per person) to 15 cfm/person. In fact, ASHRAE will recommend a base minimum rate for general office space of 20 cfm/person. While not a complete solution to all indoor air contamination problems, the new ventilation rates go a long way toward improving indoor air quality.

The need for changes in building and maintenance practices has also been recognized by the National Research Council (NRC). In its 1987 report entitled "Policies &

Procedures For Control of Indoor Air Quality," the NRC stated:

> In many instances good design practice, good construction practice, and good operation and maintenance practice are just what is needed to assure good indoor air quality (page 25).

In its conclusions, the NRC also made the following statement:

> A commitment to improved quality of maintenance and monitoring of system performance could significantly reduce occupant complaints (page 5).

BCIA supports the provision in Section 6(c) of the Bill for the continued involvement of the Indoor Air Panel of the EPA Science Advisory Board. We believe that the Indoor Air Quality and Total Human Exposure Committee of the EPA Science Advisory Board has sufficient experience and an excellent scientific background for providing scientific oversight of EPA's activities in this area.

We do have a concern, however, with the proposal that a representative of the Agency for Toxic Substances and Disease Registry (ATSDR) and the National Institute for Environmental Health Sciences (NIEHS) shall participate in the work of the Board as ex officio members. ATSDR and NIEHS already participate with other federal agencies as

members of the Interagency Committee on Indoor Air Quality (CIAQ). While effective communication should be established between the CIAQ and SAB, the direct participation of federal agency representatives in Board deliberations could compromise the scientific independence of the SAB. It is extremely important that the SAB remain independent of all government agencies.

B. Potential Regulatory Implications

BCIA has concerns about three inter-related provisions in the Bill which we believe may lead to unnecessary and inappropriate regulations. The legislation would require EPA to do the following:

- o list contaminants in indoor air;
- o prepare "health advisories" for each contaminant, setting forth the concentration at which there is no known or anticipated human health effect, with an adequate margin of safety; and
- o take action to reduce exposure to the listed contaminants to the no effect level set forth in the advisory.

While we are aware that the sponsors of this Bill intend that it not impose any new regulations, we are

concerned that these three provisions taken together may have the effect of imposing new and substantial regulatory requirements on the business community. We therefore urge the Committee to carefully evaluate the precise way in which these sections will work in practice in order to avoid unnecessary and burdensome regulations.

BCIA has a particular concern with the health advisory provision of the Bill. The Bill provides for the preparation and issuance of detailed health advisories on listed contaminants. We continue to be concerned that many advisories may unduly alarm untrained readers. The public may believe that they are being exposed to significant health risks, when actual risks may be as low as zero.

BCIA is sympathetic to the dilemma EPA faces. On the one hand, we understand the desire to communicate risk information to persons who are actually at risk from exposures that result in adverse health effects. On the other hand, it would be misleading to provide health advisories which bear no relationship to actual risks. There are complex and changing atmospheres in indoor environments which do not lend themselves to the development of specific health advisories. Concern expressed about one

situation may not be applicable to another. Yet attempting to describe varying circumstances in a single advisory may simply confuse and mislead.

We believe that Section 6 of the Bill is not sufficiently tied to providing relevant information about real and significant risks; rather, it may provide misleading information about risks that are sometimes over-estimated or are nonexistent. Thus, a health advisory which describes "the adverse human health effects of the contaminant in various indoor environments and in various concentrations" would be likely to convey information about risks which bear no relationship to actual exposure conditions. Such an approach will cause unnecessary alarm and concern among consumers who may be exposed to little or no risk at all.

Because of the impact health advisories are likely to have on the market for products and services, including products and services that are already regulated under specific laws, BCIA believes that the Bill should require that EPA meet a minimum standard of scientific support. The Bill does not require that there be a minimum level of scientific data before advisories may be written and "safe"

levels set. We believe that a poorly substantiated health advisory can have the same effect as regulatory action under Section 6 of the Toxic Substances Control Act or a pesticide cancellation under FIFRA or another regulatory action under another statute. Yet action under these laws must be supported by some minimal level of scientific data. However, a health advisory need only be based on the "most current available" information, even if that information does not satisfy an existing minimal evidence standard. Because no effort is required to ensure the accuracy of scientific conclusions, the health advisories could easily be misused.

BCIA has not attempted to comment in detail on each provision of the Bill, but has instead offered its principal comments on some of the aspects of S. 657 with which we disagree. Many provisions of the Bill are consistent with BCIA's views of the most promising directions that should be taken to protect and improve indoor air quality. We thank you for calling upon BCIA to present its views, and we look forward to working with the Subcommittee as it continues its consideration of indoor air legislation.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
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TESTIMONY OF

J. DONALD MILLAR, M.D.

DIRECTOR

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

CENTERS FOR DISEASE CONTROL

Before the

SUBCOMMITTEE ON SUPERFUND, OCEAN AND WATER PROTECTION

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE

May 26, 1989

I am Dr. J. Donald Millar, Director of the National Institute for Occupational Safety and Health (NIOSH) of the Centers for Disease Control, in the Public Health Service of the Department of Health and Human Services. I appreciate this opportunity to report to you on the activities of NIOSH in the area of indoor air quality.

Our experience with evaluating and understanding indoor air quality problems is based on the research and technical assistance that we have conducted under the mandates of the Occupational Safety and Health Act (OSH Act). Our knowledge, therefore, relates to the health effects on workers in nonresidential and nonindustrial workplaces, including Federal buildings, schools, and other public buildings, commercial buildings and portions of commercial vehicles occupied by workers. In addition to dealing with air quality, this knowledge base includes data on ergonomic and psychosocial problems that also affect workers.

More specifically, most of our knowledge on indoor air quality problems has been generated on the "technical assistance side" of our responsibilities under the OSH Act. This assistance is conducted under Section 20(a)(6) of the OSH Act through our Health Hazard Evaluation (HHE) Program, where we respond to requests from employers, employees, employee representatives, State and local agencies and other Federal agencies. Presented below is a brief narrative of how the HHE Program is utilized for indoor air quality investigations, and what we have learned from these investigations in regard to the extent of the problem. Additional details are shown in Enclosure I.

In the 1970's, following the Arab oil embargo, energy conservation programs were encouraged throughout the United States. The operations of buildings changed in an effort to conserve fossil fuels and operating costs. Ventilation rates were reduced and buildings were sealed to prevent infiltration of untempered outside air (hot, humid air in the summer months and cold, dry air in the winter months). At the same time, there was a revolution occurring in buildings throughout the country. Computers forced a change in office procedures and productivity leading to ergonomic and organizational stress problems. Some of these new office technologies brought with them chemical and physical hazards.

We saw the effect of the conservation measures, as well as problems associated with the shifts in office automation (e.g. video display terminals, vision problems), and concern about asbestos and radiation, through increases in requests for assistance in the HHE Program. Of the 1,200 Health Hazard Evaluations between 1971 and 1978, NIOSH investigated six indoor air quality problems or 0.5% of the total. From 1978 to 1980, the percentage of HHE's concerning indoor air quality increased to 7.4%, and since 1980 these HHE's have averaged 12% of all health hazard evaluations. More recently, on an annual basis, this has increased to approximately 20%. For example, in FY 1988 through the present, NIOSH's toll free information number has received an average of approximately 60 inquiries and requests for assistance per month on indoor air quality problems. In 1988, in addition to providing background information and a copy of NIOSH's indoor air quality guidance document (Enclosure I) to most of these callers, NIOSH researchers conducted 45 field investigations.

Table 1 presents the number of HHE investigations by building type since the Program was initiated in 1971. (These totals do not include complaints arising from asbestos contamination--the number of which also is significant--or complaints regarding radon.)

TABLE 1

NIOSH Indoor Air Quality
Investigations by Building Type
(through December 1988)

Building Type	Number Completed	Percent of Total
Government and Business Offices	426	80
Schools and Colleges	68	13
Health Care Facilities	35	7
Total:	529	100

We have not seen a decrease in indoor air problems and we are concerned that as the U.S. moves more and more to a service and information economy, with increases in office workers, the problems will increase.

Indoor air quality problems may arise from a variety of sources including human metabolic activity, smoking, structural components of the building and contents, biological contamination, office and mechanical equipment, and outside air pollutants that enter the building. Commonly, the symptoms and health complaints reported by workers are diverse and not specific enough to readily identify the causative agent (Table 2). The workplace environment is implicated by the fact that these symptoms normally disappear on weekends away from the buildings. At times, these symptoms can be severe enough to result in missed work, reassignment, and even termination. This causes increased anxiety among the workers and, often times, makes the investigation of these problems even more difficult.

TABLE 2

Common Health Complaints

Eye Irritation
Dry Throat
Headache
Fatigue
Sinus Congestion
Skin Irritation
Shortness of Breath
Cough
Dizziness
Nausea
Sneezing
Nose Irritation

Although some of these episodes may be made up of several factors combined, we have classified the results found in our HHE Program by primary type of problem found: contamination from the building materials (4%); microbial contamination (5%); other contamination from inside the building (15%); contamination from outside the building (10%); inadequate ventilation (53%); and unknown (13%).

As mentioned above, in over half of our indoor air quality investigations, inadequate ventilation was found to be the cause of complaints. Heating, ventilating, and air conditioning (HVAC) conditions that can cause indoor air quality problems include migration of odors or chemical hazards between building areas, re-entrainment of building exhaust through heat recovery devices or improper placement of exhaust and intake stacks, buildup of microorganisms in HVAC system components and poor odor and environmental control due to insufficient "fresh" outdoor air. The insufficient use of "fresh" outdoor air has been compounded by reduction in ventilation airflows because of energy conservation. The inadequacy of building ventilation can be evaluated by monitoring ambient carbon dioxide (CO_2) concentrations, temperature, humidity, and airflow. However other chemical agents from

sources other than human occupants also increase with inadequate building ventilation.

In 20-25% of our indoor air quality surveys, sources inside the building have been identified as the major generators of indoor air pollution. To date, common sources that have been identified include: duplicators-methyl alcohol; signature machines - butyl methacrylate; blueprint copiers--ammonia; acetic acid; pesticides; boiler additives--diethyl ethanolamine; cleaning agents; tobacco smoke and combustion gases; foam insulation, particle board, plywood, construction glues and adhesives--formaldehyde, and organic solvents; lined ventilation ducts--fibrous glass; silicone caulking and curing agents. In these situations, we have found that low concentrations of agents need to be monitored since odor thresholds, comfort and unusual stimuli may be the significant factors rather than higher concentrations where health effects have been established. Also, in many instances no evaluation criteria exist, and the investigators must compare areas where complaints are frequent with areas which have no complaints to search for chemical, biological, physical, and organizational factors which may be the cause. Given the problems with identifying emission sources and the need to measure at low levels, sensitive and specific direct-reading instruments are useful as screening tools. Many times direct-reading instrument measurements need to be followed with highly specific, low level chemical analysis in the laboratory.

To complicate the investigations concerning poor air quality, ergonomics and psychosocial issues often are encountered. For example, our research teams, composed of behavioral scientists, physicians and industrial hygienists, have investigated a series of mass illness outbreaks in various work settings for which there was no apparent physical or chemical cause. The reported symptoms

are typically vague and nonspecific, and frequently are described by workers as ill defined contaminants in the workplace (e.g., bad odors, stuffy or heavy air). Questionnaire surveys and interviews of both affected and unaffected workers suggest that the expression of the symptoms may have been exacerbated by a variety of ergonomic, organizational and psychosocial stresses which increase worker job and life-dissatisfaction.

Aside from the NIOSH experiences discussed above, there have been considerable activities by other governmental and nongovernmental groups worldwide of which I am sure you are aware. Some major examples of these are as follows:

1. The National Research Council's Assembly of Life Sciences published "Indoor Air Pollutants" in 1981. The report lists a number of chemicals implicated in indoor air pollutant problems without assessing their importance. The Assembly also recommended that monitoring protocols and special instruments be developed to assess indoor air pollutants; that complaints of malaise, headache, stuffiness, and eye and throat irritation be studied; that the lowering of work productivity due to indoor pollution and associated discomfort be investigated; and that the influences of building design on the concentration of pollutants in commercial facilities be conducted.

2. The Environmental Protection Agency (EPA) published "EPA Indoor Air Quality Implementation Plan" in 1987 which not only described EPA's research agenda at that time, but dealt with those indoor air quality issues that concerned other Federal agencies. The document included a bibliography of indoor air quality literature containing over 2,000 entries.

3. In 1988, the Health and Safety Executive of Great Britain issued a report "Sick Building Syndrome: A Review." This report summarizes their experiences with "sick building syndrome," and discusses symptoms, common features of "sick buildings" and possible causes. Their experiences mirror that information found by our HHE Program.

4. A 1988 EPA publication, "Indoor Air Quality in Public Buildings" reported that concentrations of volatile organic compounds in new buildings were found to be as much as 100 times higher than those found outdoors.

5. Volume II of the Environmental Protection Agency's Report to Congress prepared in 1988/89 under Title IV of the Superfund Amendments and Reauthorization Act of 1986 highlights an up-to-date summary of the "Assessment and Control of Indoor Air Pollution." This volume discusses such issues as (a) factors affecting indoor air quality; (b) sources of pollutants and health effects; and (c) economic impacts.

These examples support the point that indoor air quality problems associated with worker health are significant and require continued vigilance.

In regard to your questions pertaining specifically to the Indoor Air Quality Act (S.657), the Administration has not yet taken a position on the specific contents of the proposed legislation.

Thank you for the opportunity to submit this testimony to the record.

ENCLOSURE I

THE NIOSH APPROACH TO CONDUCTING INDOOR AIR QUALITY INVESTIGATIONS IN OFFICE BUILDINGS

National Institute for Occupational Safety and Health

ABSTRACT

Since 1971, personnel from the National Institute for Occupational Safety and Health (NIOSH) have completed over 500 indoor air quality (IAQ) investigations in a variety of office building environments. Most of these investigations have been conducted since 1979, paralleling the energy conservation concerns of building owners and operators. These investigations have been conducted under the authority of the NIOSH Health Hazard Evaluation Program and have been in direct response to reported health complaints or illness. Therefore, these IAQ investigations are intended to establish the identity of a problem and to recommend solutions for its correction. Over time, we have developed a consistent methodology with a "solution-oriented" approach to conducting these IAQ investigations. To initiate the investigation, the NIOSH team gathers background information by telephone and then makes a site visit to interview the affected employees and establish symptom identity and prevalence. During this initial site visit, the investigators also attempt to identify sources of contaminants, evaluate comfort parameters, and assess ventilation system performance. A variety of applicable evaluation criteria may be used, including "rules-of-thumb" gleaned from the current scientific literature and our own experiences. If specific problems cannot be identified through these initial means, follow-up visits are then used to pursue a continually narrowing range of possibilities. This "solution-oriented" approach has resulted in the best allocation of our resources and has allowed the most efficient use of in-field as well as analytical personnel. In the IAQ investigations completed to date, problems were found to result from building material contaminants in 4%, microbiological contaminants in 5%, contaminants brought in from outside the building in 10%, contaminants from inside the building in 15%, and inadequate ventilation problems in 53%. The remaining 13% represent those investigations where no problem could be identified.

INTRODUCTION

The sometimes questionable quality of indoor air and the potential for health risks have become major concerns of building occupants, especially office workers. Some potential indoor exposures, such as to the carcinogen, asbestos, have well-documented health implications. But, more commonly, the health risks of other

indoor air exposures are poorly understood. Nevertheless, office workers experiencing indoor air quality (IAQ) problems often demand a complete evalu- ation of their work environment and of the effect it may have upon their health.

At the National Institute for Occupational Safety and Health (NIOSH), the majority of our indoor air quality investigations are conducted as part of the Health Hazard Evaluation Program. We conduct these health hazard evaluations at the request of employee groups, unions, management, and local, state and Federal agencies. Generally, these requests are in response to existing worker health complaints and illness. Because we are essentially "invited" to conduct these investigations, the data presented here will not reflect a statistically valid cross-section of the indoor air quality problem. However, these findings are drawn from one of the largest single information bases currently available on the subject. In essence, this paper will summarize the NIOSH methodology currently used during our IAQ investiga- gations and some of the data from these IAQ investi- gations completed since the start of the Health Hazard Evaluation Program.

METHODOLOGY

We have found that investigating IAQ problems can present a formidable challenge which, in some ways, is more difficult than evaluating industrial environments. In an industrial situation, the evaluation will be directed by investigations of the materials used by, or in the vicinity of, the affected workers. These materials can usually be chemically analyzed which permits characterizing exposures through the use of standard industrial hygiene techniques and potential health effects using standard medical and epidemiologic techniques. Frequently there are exposure criteria which can be applied to help interpret the data obtained. This is rarely the case with an indoor air quality problem.

Indoor air quality investigations tend to become more complicated as time passes without identification of a cause. Frustrations result in highly charged emotions which only further impede continued evaluation efforts. These situations are further complicated by the fact that symptoms are not easily attributed to a single cause and the application of standard industrial hygiene, medical and epidemiologic techniques may prove to be inconclusive.

Over time, our approach in evaluating this situation has changed. We have developed a more consistent, solution-oriented approach that system- atically excludes a continually narrowing range of possibilities. Generally, this exclusion hierarchy, which has come about based on our past experiences, involves evaluation of physical, chemical and micro- biological factors, in the order presented. Each of these potential causation categories are discussed in more detail later in this presentation.

Since we anticipate that IAQ requests will continue to represent a substantial percentage of the total health hazard evaluation requests (currently about 20%), three response levels have been

developed. Based on information obtained during an initial telephone conversation with the requestor, the following responses are possible:

1. Provide "self-help evaluation" materials (attached). Remain available for consultation by telephone. Become more involved, if necessary.

2. NIOSH conducts an initial evaluation and provides recommendations to solve the problem or for further study on a "self-help" basis.

3. NIOSH conducts a full-scale investigation.

The NIOSH investigation team commonly includes an industrial hygienist and physician/epidemiologist, but can also include other professionals such as an engineer. Most investigations contain the following parts: background assessment, initial site assessment, and, if necessary, additional site assessments.

BACKGROUND ASSESSMENT

For the background assessment, we initially obtain, by telephone, as much information on the building as practicable, an idea of the symptoms being experienced, and a chronology of the problem. Much of this information can be collected using a standard questionnaire. We also request copies of other previous investigations which are relevant to the problem at hand. These data are then used to tailor the protocol for the initial site assessment so as to make it more efficient.

INITIAL SITE ASSESSMENT

For the initial site assessment, a common protocol includes five separate steps or parts: an opening conference, a walk-through evaluation, personal interviews, phase I of environmental monitoring, and a closing conference.

Opening Conference--The opening conference is attended by representatives of the employer and employees (where applicable) as well as someone who has knowledge of the operation, and maintenance of the building's heating, ventilating and air conditioning (HVAC) systems. This meeting serves to present NIOSH's role, discuss anticipated activities and arrange to receive copies of pertinent data not already received.

Walk-through Survey--The walk-through survey will involve all or part of the building including inspec- tion of the HVAC systems with special attention given to the mechanism by which outside air enters each HVAC unit. Architectural plans and ventilation test and balance reports may also be reviewed during this phase. Potential sources of emission are identified so that each may be further evaluated, as needed.

Personal Interviews--Personal interviews are often conducted to determine the extent, prevalence and character of reported symptoms. The use of a question- naire such as the one shown in Appendix 1, may be the most efficient means of collecting this type of infor- mation. It can be used as a guide during personal interviews or it can be self-administered.

Phase I Environmental Monitoring--Phase I environmental monitoring is usually conducted on each initial survey. The scope of this effort may vary, but usually will either evaluate certain aspects of the building environment, which we have come to believe are important factors in all investigations, or explore any other possibilities made apparent from the background assessment. Evaluation of the ventilation system using both actual measurement and/or carbon dioxide (CO_2) techniques, and monitoring temperature and relative humidity are useful procedures for all evaluations during the initial site assessment. Monitoring for formaldehyde is an example of a specific method which may be used if the backround assessment indicates that respiratory system and eye irritation are prevalent complaints and the space has been recently built or renovated (a number of furnishings are potential sources of formaldehyde). Most of the monitoring accomplished on the initial survey is obtained using direct-reading instruments where possible because they provide results on-the-spot. Any deficiencies noted can be corrected and re-evaluated. Extensive and expensive sampling for other contaminants is not recommended initially unless a particular contaminant source is being evaluated. Trace concentrations of hundreds of compounds could be identified depending on the extent of the sampling and analytical effort; however, the concentrations usually detected would not be expected to cause adverse health effects in a normal healthy individual. Other techniques which I will now discuss have been consistently more useful.

Evaluating HVAC Systems--HVAC systems can be complicated and and most industrial hygienists have received very little or no training in the design, maintenance and trouble-shooting of building ventilation systems. The most important aspect of evaluating HVAC systems is to gain an understanding of how they are supposed to be working and then use some relatively simple methods to convince yourself that the system is performing up to the design specifications, and whether this is adequate with respect to the complaint areas in the building. Once you are sure that outside air is entering the building, return to the complaint area(s) and measure supply and return air flows using either a velometer or a flow hood and compare the results to the design quantities. Note that in variable-air-volume (VAV) systems the supply air flows may vary during the day.

A method which is gaining popularity, and which is currently used by NIOSH for evaluating the adequacy of ventilation to an area is the measurement of CO_2 concentrations. Humans expire significant quantities of CO_2. The higher the CO_2 levels inside a building, the poorer the overall ventilation, in a general sense. We believe that complaints will not be prevalent if interior CO_2 concentrations are maintained at twice or less the outdoor levels (usually 250-300 ppm). At CO_2 concentrations above 1000 ppm, or 3 to 4 times the outdoor level, complaints of headaches, tiredness, eye, nose and throat irritation may be more prevalent. It is important to realize that it is not the CO_2 concentration that is causing the symptoms; but, if CO_2 increases, so may all the other normal airborne contaminants and it may be some combination of all these substances that make people uncomfortable. Carbon dioxide measurements can be obtained using standard detector tubes or portable CO_2 monitoring instruments. The use of CO_2 as an index of the general quality of indoor air is currently being evaluated by NIOSH as well as many other agencies.

Poor mixing of air is another potential problem sometimes found when air is delivered and returned through ceiling diffusers. Standard smoke tubes, and temperature and CO_2 measurements at 1 foot and 7 foot heights above the floor may be useful techniques in evaluating stratification resulting from poor mixing.

Monitoring Temperature and Relative Humidity-- Temperatures too cold, too warm or fluctuating can be a source of complaints. While individuals vary in their limits of thermal comfortability, if a significant number of workers in and area complain (more than 20%), then temperature and relative humidity may be creating an uncomfortable environment. If temperatures are too warm, complaints of tiredness, lack of concentration and headache may also be reported. Low relative humidities, not uncommon in the winter in a building or residence that is not humidified, can cause eye, nose and throat irritation.

CLOSING CONFERENCE

The closing conference of the initial site survey provides an opportunity to present the NIOSH activities accomplished, any results obtained and recommendations on corrective actions if potential problems were identified. If no problems were identified, recommen- dations may be made on how to continue studying the problem either on a self-help basis or through continued NIOSH involvement. Typical recommendations when we have not identified a probable explanation for the reported symptoms would include the formulation of a more formalized method of reporting worker symptoms on a daily basis and the generation of HVAC data logs to provide evidence that the HVAC system is performing in a consistent manner over time.

EVALUATION CRITERIA

Evaluation criteria used to interpret environmental measurements vary. In the classic industrial hygiene sense, the Occupational Safety and Health Administration's (OSHA) permissible exposure limits [1], the American Conference of Governmental Industrial Hygienists' (ACGIH) Threshold Limit Values [2], and NIOSH's recommended exposure limits [3] are most commonly used in occupational exposure assess- ments. Because these criteria are based on health effects as they pertain to the manufacturing environment, they may not have the same relevance for workers in an office setting, whose primary concern may be for comfort or simply an absence of unusual sensory stimuli over their working period. The Environmental Protection Agency (EPA) has ambient air quality standards [4] for a variety of pollutants designed to protect the public over an entire day (not just an 8-hour workday). However, these, too, may not have relevance to an indoor office environment, especially from the perspective of problem-solving.

The American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) guidelines for acceptable indoor air quality [5] have been developed for the indoor environment. We commonly use these as criteria in our office building evaluations, especially for assessing the performance of a venti- lation system. We also use the ASHRAE comfort guide- lines [6] as criteria for assessing the thermal performance of occupied space.

ADDITIONAL SITE ASSESSMENTS

If the background assessment and the initial site visit identify a problem that needs further definition, or if no problem can be isolated, an additional site assessment may be performed. During the additional site assessment, more specific and extensive monitoring may be conducted for chemical and/or microbiological contaminants of interest. Sampling for airborne microbiological contaminants is also outside of what is considered a standard industrial hygiene technique. Useful techniques are still under evaluation. Methodology is available, however, analytical support is somewhat limited. Nevertheless, the topic of potential microbiological contamination usually comes up as an investigation progresses. Close visual inspection of the various HVAC components will usually uncover a microbiological problem if present.

The condition most commonly associated with exposure to airborne organisms is hypersensitivity pneumonitis. This is a general term for a disease which occurs as a result of an immunologic inflammatory reaction to the inhalation of any of a variety of organic dusts. Terms like humidifier fever, venti- lation pneumonitis, farmer's lung and cheese worker's lung are all the result of these exposures. Symptoms are usually described as a recurring "flu-like" syndrome. Diagnosis is based on a combination of characteristic symptoms, chest x-rays, pulmonary function abnormalities and sometimes immunologic studies [7].

Inspection of the HVAC system and confirmation of the diagnoses of hypersensitivity pneumonitis among workers may be more useful than air sampling for airborne microorganisms until investigative techniques are further refined.

DISCUSSION

Through December 1988, 529 NIOSH indoor air quality health hazard evaluations have been completed (Table 1). These do not include our investigations of asbestos-in-building problems, but only those where the building occupants were actually experiencing ill health effects. The number of investigations has increased markedly since 1979. This is most probably due to a couple of factors: increased energy conser- vation measures and increased worker awareness of their office environment. We now average about two indoor air quality investigations per week.

TABLE 1

NIOSH INDOOR AIR QUALITY INVESTIGATIONS
BY YEAR (THROUGH DECEMBER 1988)

Year	Number Completed	%
Pre-1978	6	1
1978	9	2
1979	12	3
1980	28	6
1981	82	18
1982	52	12
1983	61	14
1984	56	13
1985	81	18
1986	59	13
1987	38	8
1988	45	9
Total:	529	100

While the majority of our investigations have been conducted in government and private-sector office buildings (Table 2), we have also looked at problems in schools, colleges, and health care facilities.

TABLE 2

NIOSH INDOOR AIR QUALITY INVESTIGATIONS
BY BUILDING TYPE (THROUGH DECEMBER 1988)

Building Type	# Completed	%
Government And Business Offices	426	80
Schools And Colleges	68	13
Health Care Facilities	35	7
Total:	529	100

Commonly, the symptoms and health complaints reported by the office workers are diverse and not specific enough to readily identify the causative agent (Table 3). The workplace environment is implicated by the fact that these symptoms normally disappear on weekends away from the office. At times, these symptoms can be severe enough to result in missed work, reassignment, and even termination. This causes increased anxiety among the workers and, often times, makes the investigation of these problems even more difficult and frustrating.

TABLE 3

COMMON HEALTH COMPLAINTS

Eye Irritation	Shortness of Breath
Dry Throat	Cough
Headache	Dizziness
Fatigue	Nausea
Sinus Congestion	Sneezing
Skin Irritation	Nose Irritation

Although many of these problems may be multifactorial, we have classified our evaluations by primary type of problem found: contamination from the building material (4%); microbiological contamination (5%); contamination from outside the building (10%); contamination from inside the building (15%); inadequate ventilation (53%); and unknown (13%) (Table 4). There are some shortcomings to these data, however, in that they may not represent a "true" cross-section of the indoor air quality problem as previously discussed. For example, we have not used a standard protocol for all these evaluations, as our methods and criteria have evolved with time and experience. Also, since many of these investigations were reviewed retrospectively, there may be some misclassification due to the vagueness of earlier reports. Lastly, we have little follow-up data on many of these evaluations to enable us to determine the efficacy of our recommendations [8].

TABLE 4

NIOSH INDOOR AIR QUALITY INVESTIGATIONS
BY PROBLEM TYPE (THROUGH DECEMBER 1988)

Problem Type	# Completed	%
Building Materials Contamination	21	4
Microbiological Contamination	27	5
Outside Contamination	53	10
Inside Contamination	80	15
Ventilation Inadequate	280	53
Unknown	68	13
Total:	529	100

BUILDING MATERIALS CONTAMINATION

Contamination from building materials and products was the major problem in 4% of our investigations. Formaldehyde can off-gas from urea-formaldehyde foam insulation, particle board, plywood, and some glues and adhesives commonly used during construction. Other building fabric contamination problems encountered include dermatitis resulting from fibrous glass, various organic solvents from glues and adhesives, and acetic acid used as a curing agent in silicone caulking.

MICROBIOLOGICAL CONTAMINATION

Five percent of our investigations have involved some type of microbiological contamination. Even though this is not a common cause of

office problems, it can result in a potentially severe condition known as hypersensitivity pneumonitis. This respiratory problem can be caused by bacteria, fungi, protozoa, and microbial products that may originate from ventilation system components. A similar condition known as humidifier fever, most commonly reported in Europe, is also the result of microbiological contamination in ventilation systems. In our investigations, micro- biological contamination has commonly resulted from water damage to carpets or furnishings, or standing water in ventilation system components.

OUTSIDE CONTAMINATION

Contamination from sources outside the office space was the major problem identified in 10% of our investigations. Problems due to motor vehicle exhaust, boiler gases, and previously exhausted air are essentially caused by re-entrainment. This is usually the result of improperly located exhaust and intake vents or periodic changes in wind conditions. Other outside contamination problems include contaminants from construction or renovation such as asphalt, solvents, and dusts. Also, gasoline fumes infiltrating the basement and/or sewage system can sometimes be a problem and are usually caused by gasoline leaks from ruptured underground tanks at nearby service stations. One of the most common sources of outside contamination has been carbon monoxide fumes from basement parking garages being recirculated through the building ventilation system.

INSIDE CONTAMINATION

Contamination generated by sources inside the office space was the major problem identified in 15% of our investigations. Copying machines are often found to be a significant source. Examples of this type of problem would include methyl alcohol from spirit duplicators, butyl methacrylate from signature machines and ammonia and acetic acid from blueprint copiers. Still other inside contamination problems we have encountered include pesticides which were improperly applied; dermatitis from boiler additives such as diethyl ethanolamine; improperly diluted cleaning agents such as rug shampoo; tobacco smoke of all types; combustion gases from sources common to cafeterias and laboratories; and cross-contamination from poorly ventilated sources that leak into other air handling zones.

Contaminants from inside or outside the office space, and from the building fabric are essentially chemical contaminants. Many times odors are associated with some of these contaminants which may aide in source identification. Additionally, in most cases, these chemical contaminants were measured at levels above ambient but far below any existing occupational standard.

INADEQUATE VENTILATION

In 53% of our investigations, the building ventilation has been inadequate. When evaluating building ventilation, we normally use ASHRAE standards for comparison. ASHRAE standards 62-1981, "Ventilation for Acceptable Indoor Air Quality" (ASHRAE 1981) and 55-1981, "Thermal Environmental Conditions for Human Occupancy" (ASHRAE 1981) are both

used. Some of the ventilation problems we commonly encounter are: not enough outdoor air supplied to the office space; poor air distribution and mixing which causes stratifi- cation, draftiness, and pressure differences between office spaces; temperature and humidity extremes or fluctuations (sometimes caused by poor air distri- bution); and air filtration problems caused by improper or no maintenance to the building ventilation system. In many cases, these ventilation problems are created or enhanced by certain energy conservation measures. These include reducing or eliminating outdoor air; reducing infiltration and exfiltration; lowering thermostats in winter, raising them in summer; eliminating humidification or dehumidification systems; and early shut-down and late start-up of the ventilation system.

CONCLUSION

The major problems identified in these NIOSH indoor air quality investigations can be placed into three general categories listed with decreasing frequency: inadequate ventilation, chemical contamination, and microbiological contamination. Inadequate ventilation is the single largest problem we have seen in buildings. Although varied, these ventilation problems commonly can allow a build-up of any contaminants present in the occupied space to the point that adverse health effects are experienced or allow the environment to become annoyingly uncomfortable to the office workers. As our experience increased over time, we developed a solution-oriented approach to conducting these evaluations which places a high priority on building ventilation. This approach has resulted in the best allocation of our resources and has allowed more efficient use of in-field as well as analytical time.

Increasing office worker awareness and the current shift to office-based, service-type employment will no doubt increase concerns about the indoor air quality in offices and other non-industrial settings. More research into office building ventilation and its effect on background levels of contaminants will be necessary to provide additional and more appropriate guidelines for the evaluation and control of indoor air quality problems in the future.

Early recognition of a problem, with a timely and systematic evaluation, are key factors to a quick and effective resolution.

REFERENCES

[1] OSHA, OSHA Safety and Health Standards, Occupational Safety and Health Administration, Washington, DC, 1983.

[2] ACGIH, Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment and Biological Exposure Indices with Intended Changes for 1985-86, Cincinnati: American Conference of Governmental Industrial Hygienists, 1985.

[3] CDC, "NIOSH Recommendations for Occupational Safety and Health Standards," Morbidity and Mortality Weekly Report, Vol. 34, 1985, pp. 35-315.

[4] EPA, National Primary and Secondary Ambient Air Quality Standards, Washington, DC: Environmental Protection Agency, 1971.

[5] ASHRAE, ASHRAE Standard 62-1981, "Ventilation for Acceptable Indoor Air Quality," Atlanta: American Society for Heating, Refrigerating and Air-Conditioning Engineers, Inc, 1981.

[6] ASHRAE, ANSI/ASHRAE Standard 55-1981, "Thermal Environmental Conditions for Human Occupancy," Atlanta: American Society for Heating, Refrigeration and Air-Conditioning Engineers, Inc, 1981.

[7] Levy, M.B. and Fink, J.N., "Hypersensitivity Pneumonitis", Annals of Allergy, Vol. 54, 1985, pp. 167-171.

[8] Melius, J., Wallingford, K., Keenlyside, R., Carpenter, J, "Indoor Air Quality--the NIOSH Experience," Annals of the American Conference of Governmental Industrial Hygienists, Vol. 10, 1984, pp. 3-7.

APPENDIX 1

INDOOR AIR QUALITY QUESTIONNAIRE

1. Complaints Yes _____ No _____
(If yes, please check)

_____ temperature too cold
_____ temperature too hot
_____ lack of air circulation (stuffy feeling)
_____ noticeable odors
_____ dust in air
_____ disturbing noises
_____ other
(specify) _____

2. When do these problems occur?

_____ morning
_____ afternoon
_____ all day
_____ daily
_____ specific day(s) of the week which
day(s)? _____
_____ no noticeable trend

3. Health Problems or Symptoms

Describe in three words or less each symptom or adverse health effect you experience more than two times per week.

Example: runny nose

Symptom #1 _____
Symptom #2 _____
Symptom #3 _____
Symptom #3 _____
Symptom #5 _____
Symptom #6 _____

Do the above symptoms clear up within 1 hour after leaving work?
Yes _____ No _____

If no, which symptom or symptoms persist (noted at home or at work) throughout the week? Please indicate by drawing a circle around the symptom number below.

Symptom: #1 #2 #3 #4 #5 #6

Do you have any health problems or allergies which might account for any of the above symptoms? Yes _____ No _____

If yes, please describe. _____

_____

(over)

APPENDIX 1 (CONTINUED)

Do any of the following apply to you?

_____ wear contact lenses
_____ operate video display terminals at least 10% of the work day
_____ operate photocopier machines at least 10% of the work day
_____ use or operate other special office machines or equipment (specify)

_____

_____ currently taking medication
reason for taking medication (specify) _____

_____

5. Do you smoke? Yes _____ No _____

6. Do others in your immediate work area smoke? Yes _____ No _____

7. Your office or suite number is _____

8. What is your job title or position? _____

9. Briefly describe your primary job tasks. _____

_____

_____

10. Can you offer any other comments or observations concerning your office environment? (optional)

_____

_____

_____

_____

_____

_____

_____

11. Your name? (optional) _____

12. Your office phone number? (optional) _____

ENCLOSURE II

NIOSH PROJECTS ON INDOOR AIR QUALITY THAT WERE INITIATED IN FISCAL YEAR 1989
(DOES NOT INCLUDE HEALTH HAZARD EVALUATION PROGRAM
AND INFORMATION TOLL FREE NUMBER)

These projects were initiated in Fiscal Year 1989 as part of a modest start-up effort to conduct some of the research and dissemination that was envisioned in the more rigorous and long-term program agenda that is presented in Enclosure II.

- INDOOR AIR QUALITY AND WORK ENVIRONMENT QUESTIONNAIRE

  o Goal

    To generate a valid tool to assess effects and risk factors of working in an indoor office environment.

  o FY'89 Resources

    Discretionary funds - $18,000

- SURVEY ASSESSMENT OF PHYSICAL JOB ATTRIBUTES AND THE WORK ENVIRONMENT

  o Goal

    To develop reliable and valid psychometric (e.g., self-report) measures for use across a wide variety of occupations, including workers in nonresidential, nonindustrial workplaces.

  o FY'89 Resources

    Discretionary funds - $7,000

- ANALYSIS OF INDOOR AIR CONTAMINANTS USING SOLID-SORBENT SAMPLING AND THERMAL DESORPTION/GC/MS

  o Goal

    To detect and identify, in a single air sample, most of the volatile organic compounds present at or above part per billion levels for use in investigations of indoor air quality.

  o FY'89 Resources

    Discretionary funds - $5,000

- METHODS FOR EVALUATING INDOOR AIR VENTILATION SYSTEMS

  o Goal

    To develop effective ventilation system measurement tools for indoor air quality investigations.

  o FY'89 Resources

    Discretionary funds - $29,000

- INDOOR AIR QUALITY TRAINING INITIATIVE

  o Goal

    To develop a comprehensive, up-to-date, training module for occupational safety and health paraprofessionals, professionals, and others with indoor air quality responsibility but without relevant training.

  o FY'89 Resources

    Discretionary funds - $25,000

- FOLLOW-BACK ACTIVITY TO DETERMINE THE EFFECTIVENESS OF THE CURRENT INDOOR AIR QUALITY INVESTIGATIONS CONDUCTED UNDER THE NIOSH HEALTH HAZARD EVALUATION PROGRAM

  o Goal

    To evaluate if (1) NIOSH's involvement led to a resolution of the indoor air quality problem that was being investigated and (2) if so, which parameters changed to improve the situation.

  o FY'89 Resources

    Discretionary funds - $35,000

- LIBRARY OF CONGRESS INDOOR AIR QUALITY STUDY

  o Goal

    To conduct an epidemiologic/environmental investigation in collaboration with EPA, NIST, and Yale University at the Library of Congress Madison Building.

  o FY'89 Resources

    Discretionary funds - $120,000

U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, D.C. 20207

June 1, 1989

The Honorable Frank R. Lautenberg
Chairman, Subcommittee on Superfund
Ocean, and Water Protection
Committee on Environment and Public Works
U.S. Senate
Washington, DC 20510-6175

Dear Mr. Chairman:

Thank you for your request that the Consumer Product Safety Commission (CPSC) comment on the Indoor Air Quality Act of 1989 (S.657). These comments have been prepared by the technical staff of the CPSC.

The CPSC has long been active in addressing the health hazards posed by indoor air pollutants since many of the sources of indoor air pollution are consumer products. Indoor Air Quality was afforded priority status at the Commission in 1982 through 1984 and again in 1989. The staff believes that CPSC will need to continue to play a major role in resolving current issues on indoor air quality, particularly as related to consumer products. You have asked that we specifically address three areas.

1. The seriousness and extent of the health threat posed by exposure to contaminants in the air indoors.

Presently available data are not sufficient to allow precise quantification of the impact on human health of indoor air pollution. However, the Commission staff regards it as comparable to other hazards we are addressing.

Potential health effects from exposure to indoor air pollutants include respiratory illness, neurobehavioral effects, cancer, and death (as in the case of carbon monoxide poisoning). Although respiratory disease is not solely due to indoor air pollution, many lung disorders have been attributed to, and are exacerbated by, indoor air pollution. The respiratory diseases closely associated with pollutant exposures include chronic obstructive pulmonary disease and asthma, of which there are an estimated 21.5 million sufferers; airway hypersensitivity; decreased lung growth; and increased susceptibility to acute

respiratory infections. Studies have associated these lung diseases with indoor air pollution sources, including organic pollutants from household products and building materials, combustion products from unvented appliances, and airborne biological pollutants from humidifiers and air conditioners.

A number of organic pollutants which can be emitted by household products, or building materials such as particle board and plywood have been linked to cancer, as has asbestos, which can be released by deteriorating products in the home. An estimate of increased cancer risk from these pollutants has been developed by Dr. Lance Wallace (1986) of the Environmental Protection Agency (EPA). On the basis of monitoring results from 600 homes in states of New Jersey, North Carolina, North Dakota, and California, Wallace estimates 1,240 excess cancer deaths per year based upon exposure to six of the common indoor pollutants with consumer product sources.

The Commission staff has specifically evaluated the health risks posed by the following contaminants from consumer product sources: formaldehyde; methylene chloride; asbestos; paradichlorobenzene; perchloroethylene; combustion by-products, including carbon monoxide, nitrogen dioxide, sulfur dioxide, respirable particulates, polycyclic aromatic hydrocarbons and associated organic compounds; biological pollutants, including aeroallergens and pathogens; and lead. The Commission has activities underway to address the sources of these pollutants and regards them as potentially serious health risks.

The sources of some of the contaminants cited above can be found elsewhere, in addition to consumer products. For example, pesticides, and some indoor air pollutants, such as environmental tobacco smoke and radon, are outside the scope of the Commissions' jurisdiction.

2. Needed changes or improvements to any provisions of the Indoor Air Quality Act of 1989.

Section 3(1) highlights the goal of establishing a comprehensive and coordinated program of research and development at the Environmental Protection Agency and other agencies of the United States. Section 5(a) directs the EPA Administrator to establish a national research program promoting the coordination and acceleration of investigations, surveys, and studies relating to the causes, sources, effects, extent, etc. of indoor air contamination, and to conduct epidemiological studies of the effects of contaminants on mortality and morbidity. Although the bill provides that these activities be accomplished in cooperation with appropriate federal agencies, it would be helpful if it would contain specific requirements to coordinate such activities with other federal agencies or with existing epidemiological organizations (e.g., Consumer Product Safety Commission, Department of Energy, Center for Disease Control,

National Institute for Occupational Safety and Health) or to use existing federal data collection systems where cost effective.

The staff believes that the bill would be enhanced if it would provide specific authorization for research funds to other agencies for the implementation of the National Response Plan. Furthermore it would be helpful if a mechanism would be prescribed by which authorized research funds can be distributed to the other agencies.

The staff welcomes the recognition of CPSC's authority to address indoor air quality hazards associated with consumer products in Section 7(b) of the bill. However, because CPSC is an independent regulatory agency, it would be helpful if the language regarding a National Response Plan to be developed by the Administrator of EPA clarify that such a Plan not restrict CPSC's ability to set priorities and establish its own work plan without the explicit agreement of the Commission. In the past, language such as that in Section 7(a) "in consultation with" has, in practice, meant that EPA provided other agencies an opportunity to review, but not approve, indoor air reports prepared in response to Congress.

The Commission staff believes that in many areas the bill assigns authority and responsibility to EPA to conduct evaluations and issue advisories, on indoor air quality issues that are currently being addressed by CPSC or another Federal agency. For example, the evaluation of contaminants in the context of issuing health advisories, as provided by section 6(b) of the bill, clearly overlaps with CPSC's evaluation of the same contaminants with respect to the development of product standards and regulations.

The staff offers that CPSC has considerable experience with advising the public about hazards associated with consumer products, and can effectively communicate with the public and with the product producers/manufacturers on the health risks of emissions from individual consumer products. While health advisories on indoor air contaminants would seem to advance scientific understanding, it is likely that they would overlap with the evaluations being conducted by other agencies, for example Agency for Toxic Substances and Disease Registry, National Institute for Occupational Safety and Health, and National Toxicology Program. Health advisories about a chemical or substance which did not provide the public with information on how to reduce or avoid the exposure could result in public confusion, and perhaps, undue alarm. In the staff's view the agencies charged with regulating exposure from specific sources are the more appropriate source for public notice. CPSC, for example, has issued approximately twenty "Safety Alerts" on consumer product hazards in this past year, at least two of which were on IAQ issues (see enclosures). Perhaps the direction to issue health advisories should be reserved for those exposures, such as pesticides, that are under the EPA's jurisdiction and

that direction be given to CPSC and other agencies to provide similar information on the indoor air issues under their jurisdiction.

3. Other indoor air quality issues which you feel should be addressed in this legislation.

The staff believes that the public would be better served if there would be a specified responsibility for federal agencies to coordinate activities beforehand with the state governments particularly when national alerts are being issued.

This legislation seems to focus attention primarily on non-residential non-industrial buildings, i.e., the school and office. [Section 2(14)] The Commission staff believes that residences are a major source of exposure to contaminants and that many of these contaminants are released from products under our jurisdiction.

In summary, the Commission staff believes that it is appropriate that specific emphasis be placed in the legislation on the role that the Consumer Product Safety Commission and other agencies must play in both research and hazard mitigation.

Further, as energy conservation issues are such a major concern in the development of mitigation strategies for indoor contaminants it would be helpful if the bill provided specifically for Research into those factors as well.

If you have any further questions please do not hesitate to call me on (301)492-5515.

Sincerely,

Edward D. Harrill

Edward Harrill, Director
Office of Congressional Relations

Enclosure

WRITTEN STATEMENT

of the

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.

May 26, 1989

Submitted To

U.S. SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

SUBCOMMITTEE ON SUPERFUND, OCEAN AND WATER PROTECTION

Washington, D.C. 20510-6175

The American Society of Heating, Refrigerating and Air-Conditioning Engineers, which is commonly known by its acronym ASHRAE, is a technical society of some 50,000 individual members. Membership is composed of consulting engineers, contractors, design professionals, and employees of academic and research institutions, manufacturers, and government.

ASHRAE's business is simply occupant comfort in buildings, all the technical knowledge associated with providing that comfort, and the effects of that technology on the environment. Indoor air quality is a major focus of Society activity and its Standard 62, "Ventilation for Acceptable Indoor Air Quality," is the only voluntary consensus standard available in the U.S. today to regulate the quality of the air indoors. The Attachment provides more detail about ASHRAE and its related technical materials.

Senate Bill S. 657 is a comprehensive bill directed at the broad indoor air quality problem. ASHRAE certainly supports such an effort. Three features of the bill are emphasized, and additional indoor air quality concerns are provided for consideration.

(1) A major thrust of the bill is research. Government must take a lead role in research, particularly in the area of health effects and in the area of contaminant measurements. The private sector will not be able to accomplish all the needed research in these two areas, but the private sector is able to disseminate and apply the results of such research.

ASHRAE, for example, has a research program supported by the private sector. A portion of its research dollars is directed at indoor air quality problems, but ASHRAE focuses more on buildings and building systems than on medical aspects associated with indoor air quality. Even though ASHRAE has an Environmental Health Committee with representation of health and medical professionals, the Society's principle technical expertise is not in the health field.

Another ingredient of indoor air quality research relates to what makes a "well" building healthy and comfortable. When situations occur in buildings which impact the health or comfort of building occupants, the focus is on finding solutions usually through identification and control of the sources of contaminants. In a "preventive" approach, attention should also be directed at assessments of healthy buildings to identify what features (with proven successes) result in healthy, comfortable indoor environments. Appropriate research establishing better documentation of preferred building design options merits attention in research programs.

(2) It is important that information on health effects and recommended exposure levels be disseminated to the user community. The health advisories provision, Section 6 of the bill, could be an important vehicle in this regard. Due to the widespread potential use of health advisories, recommendations should be subject to approval by an external panel of scientific experts (composed primarily of private-sector participants including academic representation).

The term advisories, in most situations, should mean "guidelines" rather than regulations; recommendations then could be put into the private sector to establish levels by promoting good design practices or, when appropriate, by developing private-sector consensus standards. Section 7c supports this activity.

(3) In the issuance of technology and management practice assessment bulletins by the Administrator, as described in Section 5d, it is important to identify the targeted audience of such bulletins - whether the target be the education of the general public or the transfer of technical data to the design professional or the sophisticated building owner/operator. The nature of the material and the detail of information would vary significantly from audience to audience.

Any bulletins for the technical community should complement or make use of existing private-sector activities. Although the buildings community is very diverse, technical societies, trade associations, and the technical and trade press have efficient dissemination vehicles in place which serve very adequately. Within the professional community, ample opportunities for technical exchanges occur through forums, seminars, short courses, journals and periodicals where new technology can be introduced in a matter of months.

Information can flow from the public sector directly into these existing channels (representing a broad range of applicable specialties). A more rapid mechanism of technology transfer which should be emphasized is the participation (as individuals) of expert governmental staff in the various technical and professional organizations, providing a beneficial, efficient, two-way flow of knowledge.

As an example of incorporation of new technology by existing private-sector channels, ASHRAE has a four-volume handbook series which represents the world's most complete technical base related to building systems for the design professional. The volumes are regularly updated on a scheduled basis. New technology, when proven, can appear in the appropriate topical ASHRAE Handbook in as short a time period as one year and not more than four years. The information is then in the hands of the ultimate user or applicator.

In situations where new (or updated) guidelines or standards are needed, the private-sector's consensus standards process is adequate and networked into national, state and local code bodies when appropriate.

Based on ASHRAE's experience in developing good design practices in the area of ventilation in buildings, two additional aspects of the poor indoor air quality should be considered in the proposed legislation:

(1) Occupant health is not the only consideration when evaluating possible indoor air quality contaminants. ASHRAE's Standard 62* incorporates health information and control levels when available, but generally the standard is considered to be what is termed a "comfort-based" standard; that is, a standard that covers contaminants and conditions in buildings which may not be a health risk but may affect indoor air quality. A combination of low-level concentrations of certain substances may not pose a health risk but may affect indoor air quality, resulting in annoyance and the perception of "sick building syndrome."

It is now generally accepted that discomfort in the work place significantly affects worker productivity and absenteeism. Studies have shown that buildings (which do not have adequate temperature and humidity control) may give the perception of "stuffy air" even when the air, itself, is relatively clean. Often, the problem has been associated with poor operation and maintenance practice. Buildings must be maintained and operated (as designed) to perform to desired levels.

* Provisions of ASHRAE Standard 62-1981 are provided in the Attachment.

(2) ASHRAE is concerned not only with the quality of the indoor environment, but also in providing good indoor air quality in a cost-effective and energy-conserving manner. These are two very important considerations in achieving good indoor environments, and these two considerations may comprise many of the technological developments needed. If cost is no consideration, any problem can be solved. If there will always be ample energy, then there is only the economic need to conserve energy. ASHRAE's Standard 90 "Energy Conservation in New Building Design" is a resource document for energy codes and standards in all 50 states. ASHRAE is very concerned about the nation's future energy situation and urges energy conservation in all buildings.

In summary, ASHRAE would encourage the committee to consider more than just health effects in classifying contaminants and ask that the committee consider cost effectiveness and energy conservation in the development of solutions to indoor air quality problem areas.

ATTACHMENT

ASHRAE Research and Technical Activities

ASHRAE is a technical society and as such has a comprehensive program of research, standards writing, and technical activities. ASHRAE has approximately one-hundred technical committees and task groups comprised of about 2000 ASHRAE members and industry-related professionals who volunteer their time and technical expertise to develop and update the Society's technical base of knowledge. The Society, in cooperation with its network of local chapters, raises funds from the private sector to conduct research to support the development and advancement of technology. Most of the research is conducted at academic institutions.

ASHRAE Environmental Health Committee

In 1984, ASHRAE recognized that many of the environmental questions related to buildings were beyond the technical expertise of most of ASHRAE's membership. ASHRAE then established a special Environmental Health Committee, whose membership represents the medical, engineering, and industry-related disciplines needed to provide the necessary input.

ASHRAE Standards Activities

ASHRAE develops voluntary consensus standards used by the industry. Most of the standards are directed to the procedures for testing and measuring, but the Society has a few standards which have public policy dimensions. ASHRAE Standard 90, "Energy Conservation in New Building Design," serves as the resource document for energy codes and standards in all 50 states. ASHRAE 100 series standards focus on energy conservation in existing buildings.

ASHRAE Standard 62

In the area of indoor air quality, ASHRAE Standard 62-1981, "Ventilation for Acceptable Indoor Air Quality," is the only definitive standard covering this issue available in the United States today.

In 1973 ASHRAE published its first ventilation standard, which was updated in 1981. As a result of ASHRAE's policy of reviewing each standard every five years, Standard 62-1981 is in the final stages of being updated with the revised standard expected to be approved and published in 1989.

The provisions are summarized briefly. The quality of outside ventilation air is specified in tables for each conditioned space in a building depending on the type and use of the space. The ventilation air quantity is specified in terms of air volume per occupant, cubic feet per minute (cfm) per person. The estimated occupancy of typical spaces is provided in the standard. Ventilation rates are specified for occupied spaces where smoking is permitted and spaces where there is no smoking. The minimum value appearing in the tables for certain non-smoking areas is five cfm per person.

The need to conserve energy is recognized in the standard by including provisions for increasing the amount of recirculated air with the application of appropriate air cleaning technology. The use of heat recovery systems, such as air-to-air heat exchangers, is discussed along with other provisions such as permitting the intake of outside air in the building to be adjusted to the number of people in the building.

The standards provides an alternate method which may be exercised by the designer. The Indoor Air Quality Procedure provides the designer with a listing of contaminants and permissible levels of contaminants, where information is available.

The proposed revision of Standard 62 increases the minimum ventilation rate from five to fifteen cfm per person. The proposed draft no longer makes the distinction between smoking and non-smoking spaces. This determination is based on the need to replenish the air and remove carbon dioxide concentration buildup produced by human occupants. Increasing the minimum ventilation rate could significantly affect energy costs if heat recovery methods are not employed. The proposed standard adjusts some of the contaminant levels appearing in the 1981 standard: formaldehyde from 0.1 ppm to 0.4 ppm and radon from 0.01 working level to 0.027 working level, which corresponds to the current EPA action level.

Other ASHRAE Standards

Although Standard 62 is the principal standard, ASHRAE has several standards related to the indoor air quality issue. Standard 55, "Thermal Environmental Conditions for Human Occupancy," specifies the combination of factors necessary for thermal comfort within a building environment. Important environmental parameters are temperature, thermal radiation, humidity, and air movement. Important occupant parameters are type of clothing and level of activity. Standard 62 requires that ventilating systems be designed and installed so that they do not cause conditions which conflict with Standard 55.

Two standards presently in the process of development, which will be available in the future, include Standard 129P, "Standard Method of Test of Ventilation Effectiveness," just underway, and a new standard to establish a method of measuring ventilation rates in detached buildings (such as single family dwellings) where air infiltration (through cracks and around windows and doors, for example) is a contributing factor.

The purpose of the new Standard 129P is to provide a repeatable and accurate method of evaluating an air distribution system's ability to provide the required levels of ventilation air to the occupants of the building.

ASHRAE Indoor Air Quality Position Paper

ASHRAE's position paper on indoor air quality reviews health issues, research needs, and identifies the various programs that ASHRAE will undertake to assist its membership and others concerned with indoor air problems. Described in the paper are health effects and control measures for groupings of pollutants and for the phenomenon known as "sick building syndrome." The pollutants covered include combustion products, volatile organic compounds, airborne allergens and pathogens, formaldehyde, radon, and asbestos.

In the position paper approved by the Society's Board of Directors, ASHRAE asserts:

1. Acceptable air quality is necessary for all indoor environments.

2. Indoor air quality should be maintained at levels expected to protect occupants from adverse health effects and discomfort.

3. No single private-sector group has the comprehensive interest, resources, and competence in indoor air quality technology to insure that a well-funded, systematic research development program is conducted.

4. The private sector will respond to the need for improved indoor air quality with improved innovative and cost-effective solutions when their desirability and efficacy have been established through nonproprietary research.

Therefore, ASHRAE recommends:

1. ASHRAE Standard 62, a comprehensive ventilation standard which recognizes the balance between conserving energy and providing for human health and comfort, should be widely disseminated and referenced by state and local building codes.

2. Support by federal governments for research in all nonproprietary areas of indoor air quality (health effects, measurement methods, modeling, and control technology) should be substantially and selectively increased. This research should address the dangers of indoor air pollution to populations identified at risk. It should evaluate the total pollutant exposure to individuals and the contributions of indoor sources to this exposure. Of particular importance are radon, asbestos fibers, unvented combustion appliances, formaldehyde, tobacco smoke, and volatile organic compounds. Cost effective and efficient means of reducing health risks must be identified in this research.

3. The private sector should be involved in improving performance standards and for enhancing its members' educational and professional practices.

4. Governments should examine the existing policy options and develop others as needed to encourage reduction of indoor air pollution.

5. Governments should assist in communication of technical information through joint sponsorship of research, publications, and conferences.

6. Local governments, assisted by federal governments, should provide educational, technical, legal, or financial assistance for the remedial actions required.

Testimony of

EARON S. DAVIS, J.D., M.P.H.

Pursuant to the May 3, 1989 hearing of the

SUBCOMMITTEE ON SUPERFUND, OCEAN, AND WATER PROTECTION

U.S. SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

Regarding S. 657

The Indoor Air Quality Act of 1989

Mr. Chairman and Members of the Subcommittee, I am Earon S. Davis, Editor of the Ecological Illness Law Report, located in Wilmette, Illinois. For the past 10 years I have spent a major portion of my time on issues involving indoor pollution. As an attorney, consultant, public health professional, policy researcher, writer and advocate, I have had contact with thousands of chemical victims, the vast majority of whom face major harm from indoor pollution.

Currently, I serve as an advisor to the several organizations involved with indoor pollution and multiple chemical sensitivity advocacy, including the National Center for Environmental Health Strategies, the National Foundation for the Chemically Hypersensitive, the Chemical Sensitivity Disorders Association, and the Human Ecology Action League. I assisted Mary Lamielle in the preparation of her testimony before this subcommittee and fully endorse that testimony, including its proposed amendments to the Indoor Air Quality Act of 1989.

I am honored to have been invited to present this written testimony regarding the Indoor Air Quality Act of 1989. This excellent bill deserves bipartisan support and prompt passage. While I will suggest some minor changes below, I give my wholehearted endorsement to this outstanding piece of legislation.

In order to make this testimony more useful, I have attempted to place my comments into a concise, organized format. I have also attached several articles I have written in order to avoid redundancy in this testimony. The following principal assertions, shown in summary form, will provide the organization for my testimony:

I. INDOOR POLLUTION IS A SERIOUS PUBLIC HEALTH PROBLEM;

II. EXISTING PROGRAMS AND INDUSTRY SELF-REGULATION HAVE NOT, WILL NOT, AND CAN NOT ADEQUATELY ADDRESS THIS PROBLEM;

III. THE ACT PROVIDES THE LEAST COSTLY, LEAST CONTROVERSIAL, AND MOST CONSERVATIVE APPROACH TO THE PROBLEM WHICH CAN BE EXPECTED TO YIELD ANY SIGNIFICANT PROGRESS;

IV. I SUGGEST MINOR CHANGES IN THE ACT, AS WELL AS THE ADDITION OF A SECTION REQUIRING A REPORT TO CONGRESS ON CHEMICAL SENSITIVITY DISORDERS; AND,

V. MULTIPLE CHEMICAL SENSITIVITY IS EMERGING AS A MAJOR PUBLIC HEALTH PROBLEM THAT MUST BE ADDRESSED BOTH WITHIN THE INDOOR AIR QUALITY ACT OF 1989 AND THROUGH NUMEROUS ADDITIONAL OVERSIGHT AND INVESTIGATIVE FUNCTIONS OF CONGRESS.

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I. INDOOR POLLUTION IS A SERIOUS PUBLIC HEALTH PROBLEM.

A. Everyone is at risk from indoor pollutants; from people living in tenements to people living in mansions or luxury condominiums and everything in between. Studies, such as those recently performed by the Environmental Protection Agency, confirm that indoor pollution is a risk for everyone, with indoor concentrations of many pollutants often far exceeding the levels of outdoor pollutants.

We must move towards a better understanding of what constitutes healthful indoor air quality. Currently, there are no relevant standards upon which to base the many crucial decisions being made which will affect the health of Americans for generations to come. Outdoor and workplace standards, which are generally not conservative to begin with, are clearly inadequate for indoor air quality. Among their deficiencies are the following:

--If existing standards were adequate to protect human health, they would not be consistently tightened every few years. The fact is that we don't know enough about the health effects of chemicals to produce definitive standards.
--Existing standards are not based on full consideration of chronic health effects other than cancer, and even cancer figures are often not conservative;
--Existing standards are based on time-limited exposures, such as the 8 hour work day. Indoor exposures, especially among high risk groups, continue for up to 24 hours per day and seven days a week.

--Existing standards are based on exposures to individual chemicals. They do not take into account exposures to multiple related and unrelated chemicals as is found in the real world. Almost no attention is paid to the cumulative, additive and synergistic effects of the multiple chemical exposures we each encounter.
--Existing occupational standards are based on healthy adult worker populations. They generally do not reflect the risks posed for high risk individuals.
--Existing environmental, occupational, and other standards are not set to protect every last person from significant health effects. This may be tolerable as applied to workplace settings, where people can arguably leave. However, at home, everyone deserves the information necessary to have an environment that will not cause illness.

B. People at increased risk include infants (and developing fetuses), the elderly, children, pregnant women, people with chronic cardiac and/or respiratory illness, and numerous other populations. Other risk factors involve economic and lifestyle considerations. For example, people forced to use a gas range as a heating source in winter, which is common in poverty areas, are at increased risk of respiratory and other problems. Many inner city residents, for safety reasons, dare not open their windows to provide necessary ventilation. Likewise, an increasing proportion of residences and offices lack the safety valve provided by openable windows. There are solutions to many of these problems, but they require thoughtful investigation and real-world considerations.

C. One growing population of special concern is people with Chemical Sensitivity Disorders. These little understood disorders represent an illness within an illness. First, something affects the central nervous and/or immune systems to create an increased sensitivity to chemically induced damage, even at amazingly low concentrations and from a widening range of substances. Second, each further minuscule exposure appears to cause transitory but disabling symptoms which may cascade into total disabling and even life threatening illness.

Many afflicted people, such as some EPA personnel exposed to new carpeting and poor ventilation, require major accommodations and lifestyle changes in order to keep these "reactions" under control. Some are totally disabled. This illness was identified more than 30 years ago and is the subject of hundreds of scientific articles. However, government agencies, academic institutions, and industry have, for various unfortunate and unacceptable reasons, avoided the entire topic.

II. EXISTING AND PROPOSED GOVERNMENT AGENCY ACTIONS AND INDUSTRY SELF-REGULATION HAVE NOT, WILL NOT AND CAN NOT ADEQUATELY ADDRESS THE PROBLEM. THIS CONCLUSION IS OBVIOUS FROM THE HISTORY OF INDOOR POLLUTION POLICY AND THE FRAGMENTED, ORPHAN-LIKE TREATMENT IT HAS RECEIVED IN SPITE OF ITS TREMENDOUS IMPLICATIONS FOR PUBLIC HEALTH.

The range of indoor pollutants is so broad and complex that it will require the integration of vast amounts of research in many different fields of science, engineering, architecture, and medicine, as well as from the jurisdictions of many different governmental entities. There must be a lead agency designated to be responsible for the development of information resources, innovative solutions, and sound policies in the area of indoor pollution. However, it is equally important to ensure that the lead agency will draw upon the entire range of resources, including the advanced work on indoor environments performed by the military and NASA.

EPA staff includes many talented, highly competent, and dedicated personnel. To this point, however, they have not been allowed to do their jobs. This Act would help to shift the focus, at least in this one program, from extraneous matters such as internal politics and "revolving doors" back to the real requisites of civil service: dedication, competence, respect for the law, and concern for the public's health.

While self-regulation is a wonderful fantasy, we can not afford to wait for self-interested parties to voluntarily perform research and data collection which will result in the discovery or confirmation of serious public health hazards. There are simply too many incentives to delay research, deny problems, and disrupt attempts to regulate. The outrageous example of the tobacco industry may be more representative of American industry that any of us would care to admit. The prime concern of manufacturers and distributors remains bottom line profits. This outlook, coupled with the extreme litigiousness of American industry, would make it absurd to rely upon self-regulation in the face of serious health hazards.

Some segments of industry appear to be so frightened about the possibility of eventual indoor pollution regulation that they will work to prevent the public from being adequately informed and protected from these unnecessary hazards. Instead, they will continue to promote hazardous products and practices on the theory that people don't really need to know.

Throughout the long history of chemical regulations, each new public health hazard has taken years of bellyaching and legal challenges to drag vested economic interests into even partial compliance with our nation's public health needs. Just remember DDT, aldrin, chlordane, urea formaldehyde foam insulation, air-tight buildings, unvented combustion heaters, tobacco smoke, and on and on. Indoor pollution has been, and will be, no exception to the tradition of foot dragging by those with vested economic interests.

Some people will point to radon as an example of how well government can, and will continue to, respond to indoor pollution problems. However, even if one agreed that radon was handled well (which may be hard to support, since it has been causing thousands of deaths annually for decades - if not centuries), this experience can not be generalized to other pollutants. Radon is unique in that no one produces it.

Thus, no one has liability as radon's manufacturer and little liability would appear to attach to its presence in the absence of fraud or gross misconduct. Such is not the case with ordinary pollutants. In addition, we have far greater understanding of radiation induced illness than we have of chemically induced illnesses. Therefore, the dangers of radon are not as subject to the innumerable factual causation questions which plague regulators and courts in the area of toxic chemicals.

Formaldehyde, pesticides, combustion sources, volatile organic compounds, and the other indoor pollutants all are subject to the high priced experts and lawyers hired by companies and interest groups to delay efforts to identify and protect the public from hazards associated with their products. Such is the history of environmental and occupational regulation and there is no reason to expect otherwise in the area of indoor pollution.

III. THIS LEGISLATION, BY FOCUSING ON THE DEVELOPMENT OF PUBLIC INFORMATION AND RESEARCH, PROVIDES THE LEAST COSTLY, LEAST CONTROVERSIAL, AND MOST CONSERVATIVE APPROACH TO THE PROBLEM THAT COULD BE EXPECTED TO YIELD ANY SIGNIFICANT PROGRESS.

A great deal needs to be done in the area of indoor pollution, and the Indoor Air Quality Act of 1989 is a major step forward. It is reasonable and conservative enough to create momentum. However, it is non-regulatory in approach and basically immune to opposition from anyone with concern for the public's health.

IV. SUGGESTED CHANGES IN THE ACT.

One of the primary obstacles to progress in indoor air quality concerns is the lack of a solid understanding of the illnesses caused and/or exacerbated by indoor pollutants. A great deal of research must be performed on the effects of indoor pollutants on cognitive functioning and other central nervous system effects. While the Act addresses this need, I believe that it would be more effective if it provided more specific direction in these areas.

For example, an entirely new type of disease is emerging from the sick buildings of our nation as well as additional environmental and occupational exposures. These illnesses, best categorized as chemical sensitivity disorders, involve increasing symptoms and disability induced by extremely low level chemical exposures. It is imperative that these illnesses receive a high research priority in order to ascertain their potential threat to the public's health as well as to our economy and even national security. I therefore suggest the following:

A. Fine-Tuning.

For some fine-tuning of the Act to address some of these problems, see the amendments suggested in the testimony of Mary Lamielle, President of the National Center for Environmental Health Strategies. I assisted in the preparation of these amendments and think they will add to the effectiveness of the legislation.

B. New Section to Study Chemical Sensitivities.

I also suggest amending the Act to require that EPA prepare a report to Congress to review the following aspects of chemical sensitivity disorders, including multiple chemical sensitivities, as a health effect of chemical exposure, both in terms of what may cause the underlying sensitivity disorders and what may cause or trigger symptoms in individuals who have these disorders:

1. Epidemiologic data and other information regarding the prevalence, severity, and etiology of these types of illnesses.

2. Medical and scientific data pertinent to the etiology, presence of markers, biochemical mechanisms, and other scientific and quasi scientific data on these illnesses.

3. A complete survey and assessment of the policies of all Federal agencies, including the military, regarding chemical sensitivity disorders, whether in written policy statements, patterns in administrative decisions, or in practice.

4. Past, current, and planned research and other studies at the Federal, State, Local, and international levels on these illnesses.

5. Availability and usefulness of whatever methods of treatment, avoidance, or coping with these illnesses may exist.

6. A thorough explanation and consideration of the economic, social, psychological, housing, employment, legal, and other needs of people with various chemical sensitivity disorders, including multiple chemical sensitivities, whether of known or unknown etiology, including but not limited to the following:

a. How the medical community is responding to people who claim to have these illnesses.
b. Social and psychological ramifications of these illnesses.
c. Economic impacts of these illnesses upon those suffering from them as well as upon employers, family members, parents, and society in general.
d. How the various government and non-government entitlement, insurance, and other compensation systems [including Federal and other disability retirement programs, State and Federal workers compensation systems, etc.] are dealing with these illnesses.
e. How people with these illnesses are faring in the legal systems, including personal injury, toxic tort, and products liability litigation.

f. How people with these illnesses are faring in terms of securing reasonable accommodations in housing, workplace, and other settings.
g. How people with these illnesses are faring in requests for supportive and rehabilitative services.

7. A detailed statement of the research needs in this area and a plan for the implementation of those specific research proposals, both within EPA and in other agencies.

8. Detailed recommendations on what various Federal and State agencies can and should do to better meet the various needs of people with chemical sensitivity disorders, both in terms of prevention of these illnesses, proper early identification of those with the illness or those with high risk factors, and in the provision of medical and non medical services to those already with the illness.

9. A detailed evaluation of the legal, economic (both costs and benefits), and ethical implications of chemical sensitivity disorders for all current Federal regulatory systems and standards pertaining to chemicals, focusing on whether and how these regulatory systems can protect people with multiple chemical sensitivities. Systems and standards to be considered include, but are not limited to, all those involving the full range of outdoor environmental protection of the air, water, toxics, hazardous waste, etc., in addition to occupational, product, transportation, housing, food and drug, and military standards.

V. MULTIPLE CHEMICAL SENSITIVITY IS EMERGING AS A MAJOR PUBLIC HEALTH PROBLEM THAT MUST BE ADDRESSED BOTH WITHIN THE INDOOR AIR QUALITY ACT OF 1989 AND THROUGH NUMEROUS ADDITIONAL OVERSIGHT AND INVESTIGATIVE FUNCTIONS OF CONGRESS.

The Indoor Air Quality Act of 1989 is a crucial step forward for the victims of MCS. However, the problems already being faced by this growing population are severe and the medical community is so polarized and political that the situation is likely to get much worse before its gets better. The requirement that EPA prepare a broad ranging review and policy analysis of MCS in a Report to Congress would go a long way to resolving some of the institutional problems which are preventing progress in this area. However, many of the problems are systemic and will require additional monitoring and creative approaches.

It is my hope that this Subcommittee, and the larger Committee on the Environmental and Public Works, will place Multiple Chemical Sensitivity on its long-term agenda. Many facets of this illness will require input from numerous diverse agencies and legislative committees, in addition to the important matters which can be addressed in this Act.

Additional attention must be paid to the prevention of this illness in the short term, to the early identification of these victims to allow for prompt environmental and medical interventions, and to the immediate needs of the victims of this potentially disabling and confusing disease. Those suffering from chemical sensitivity disorders face many unnecessary and discriminatory obstacles in their attempts to live full and productive lives as well as in securing assistance and compensation from State and Federal agencies, programs, and the legal system.

While the Act, with changes such as those proposed, will greatly assist in the process of understanding the role of indoor pollution in these illnesses, it is necessary that additional mechanisms of action be explored to deal with the immediate problems presented by these illnesses.

Following are some of the problems, the legal aspects of which are discussed more fully in the attached articles, faced by MCS victims in their attempts to survive and overcome the combined burdens of the illness itself and the severe, often discriminatory, obstacles which prevent them from recovering from the illness and becoming as productive and healthful as they might be:

1. MCS IS A NOVEL ILLNESS
The major feature of MCS which makes its victims less able to find appropriate medical attention, legal assistance, government assistance, and reasonable accommodation, is the novel nature of this type of illness. This is not just a new illness. It is an illness within an illness; an illness which defies traditional medical and scientific "conventional wisdom" and which, by its very nature (discussed in the next section), brings to light many larger social concerns with which many in our society would prefer not to deal.

MCS is most likely a product of man's misuse of his environment; his reckless polluting of our planet - not just by emissions into the air and water - but through the very products and materials we are producing to make our lives more convenient, safe, and healthful. A growing proportion of our population is succumbing to chemical sensitivity disorders and we had better do something about it.

By acknowledging MCS and providing assistance to its victims we will at least begin the process of integrating this new knowledge of man's susceptibility to his own environment. Through this process alone can we find a better balance between our economic and comfort needs and our needs for an environment that will support the survival and enhancement of our current and future generations.

2. MILLIONS OF AMERICANS MAY BE AFFECTED. A conservative estimate of those affected in some way by chemical sensitivity disorders would probably be in the vicinity of ten percent. Hopefully, a much smaller percentage is actually disabled in some way by these sensitivities, but there is insufficient data to gain an understanding of the ramifications of this illness. However, as demonstrated in the testimony of Mary Lamielle and others before this subcommittee, the problem is real, it is growing, it is catastrophic for many individuals, and our public

health system is so mired in the politics and economics of these illnesses that effective action is impossible without your help.

3. MCS PRESENTS AN INSIDIOUS DISABILITY. For those with MCS, the illness, itself, presents many obstacles to normal functioning. These, in turn, makes it more difficult for MCS victims to protect their rights. The result has been the creation of a new minority group within our society. Many MCS victims can not attend public meetings due to harmful exposures they entail. This impairs their right to petition and redress their government for grievances. They often can not read newspapers and deal with the inks, toners, and solvents involved with the normal course of writing letters and reports, and traveling to libraries and shops to gather information. An application for disability benefits, itself, presents a formidable task, and many are too discouraged to even go through the application process, let alone the confusing appeals levels.

Many people with MCS are not able to meet with lawyers, physicians, bureaucrats, and others in whose offices they must appear to secure representation, medical evaluation and government benefits. Most can not attend theatres, restaurants, social events, sporting events, and other normal social outlets. They are thus involuntarily isolated from our society. They often are forced to lead socially isolated, if not reclusive, lives. This is an unfair burden to pay merely for coming down with an illness that is not yet understood.

Thus, we must face the fact that our chemically contaminated world has created a new minority group; a new group which has been largely disenfranchised and which experiences forced isolation and segregation from the larger society. And, when MCS victims complain, they also get the same treatment afforded to other minorities; they are chastised for being litigious and not caring for the rights of the majority. Surely, one person's "sensitivity" should not affect the rights of the many to abuse themselves with tobacco smoke, pesticide exposures, and so on! Without government recognition of this illness and aggressive attention to protecting the rights of these people, they will continue to face a de facto discrimination every bit as wrong as sexism, racism, and religious intolerance.

4. SPECIFIC AREAS IN WHICH MCS VICTIMS NEED IMMEDIATE HELP INCLUDE THE FOLLOWING:

a. HOUSING. Housing with sufficiently low pollutant levels to be healthful for those with MCS is extremely expensive, usually requiring special construction. For the vast majority of those with MCS, truly safe housing, in which the person can be healthy and productive, is only a bitter dream.

In terms of government programs, there are major problems even with public housing. Those qualifying for public housing often can not live in the dwellings provided and face a general unwillingness on the part of managers and agencies to pay for modification of the physical premises or accommodations in operational practices. Some such modifications may be modest in cost, and most require operational accommodations which will allow proven non-pesticidal insect control.

b. JOBS. Employment in traditional settings is impossible for many MCS victims. Yet, within a "safe" environment, many can be highly productive. Vocational Rehabilitation programs have generally been unwilling to provide assistance to MCS victims, partially due to failure to understand the illness and partially due to limited resources.

Employers have a duty to provide a safe workplace. Yet, OSHA is of little or no assistance to workers with MCS. Standards are used against the workers, rather than for their protection. Sensitive workers are subject to abuse, intimidation, and retaliation. Accommodations do occur, but they are the exception, rather than the rule. Workers compensation systems are almost completely unable to respond to the special problems caused by these illnesses. They tend to simply deny that the problem exists, which places an impossible burden upon the claimant.

c. UNPOLLUTED OUTDOOR ENVIRONMENTS. Environmental pollution is a special problem for those with MCS. Many are forced to flee urban areas but they are likewise unable to live in agricultural areas in which pesticide use is heavy. There is an urgent need for a Federal reservation upon which an experimental community can be built to provide a place for the most severe MCS cases to live, receive treatment, and participate in sound research.

Such a development could be constructed with the use of techniques and materials which are already available and must be located in a large reservation free from nearby use of pesticides and herbicides, polluting vehicles, and so on. It must also provide for the psycho-social needs of those it serves. Such a facility would also provide a method for testing various hypotheses about the possibility that environmentally "clean" environments could actually be helpful to those with many other chronic respiratory, cardiovascular, and neurological impairments.

d. INSURANCE COMPENSATION. Insurance companies, whether through health, disability, premises, or other types of policies are almost uniformly hostile to reimbursement for expenses associated with MCS. This is to be expected when a new illness emerges for which we have no medical tradition and cure. However, the insurance industry must be forced to meet its obligations to those with MCS. That industry has been well aware of this illness for some time. Yet they have responded by trying to dodge the issue, rather than pressuring policy holders to pay greater attention to toxic chemicals and the early identification of chemically induced illness.

e. UNCONTAMINATED FOOD AND WATER. Safe food and water present major difficulties for many MCS victims. At a time when our food supply and groundwater supplies are increasingly contaminated by pesticides, solvents, and other toxic chemicals, the victims of MCS must go through great travail and expense to secure uncontaminated food and water. Since food intolerance is prevalent among those with MCS, an inordinate amount of time and money must go into securing these basic necessities. Federal policies encouraging crop and livestock production without toxic chemicals and with the absolute minimum of drug use, will enhance the health of our nation as well as provide a more readily available supply of food and water for those with MCS.

f. GOVERNMENT ENTITLEMENT PROGRAMS. Medicare, Medicaid, Social Security, and other programs routinely subject MCS victims to increased scrutiny, often rejecting out of hand the provision of medical equipment and services simply due to the emerging nature of this illness. While progress has been made in this area, each MCS victim must face an extreme burden of proof and administrative paperwork which poses a major obstacle in itself, for those in such critical need of entitled services, equipment and financial support.

g. ACCESS TO PUBLIC BUILDINGS. Many people with chemical sensitivity disorders are deprived of the use of public facilities, including schools and even hospitals, because of the unnecessary presence of indoor pollutants, including tobacco smoke, pesticides (which frequently are applied excessively or without cause when less toxic alternatives are available), art and craft materials, use of paints and solvents during business hours, disinfectants, and perfumes and fragrances. People with MCS, for example, are faced with chemical barriers which deny their participation in important societal events just as much as the lack of ramps and elevators affects people confined to wheel chairs.

h. DE-CONTAMINATION OF THE U.S. MAIL. People with MCS, as well as people with asthma and other respiratory disorders, frequently become ill when exposed to perfumes and fragrances. Please note that perfumes and fragrances are often toxic in their own right. Currently, the postal service permits the perfuming of "junk mail" and the distribution of perfume-saturated inserts in magazines. For someone who is sensitive to perfumes, this may cause serious problems as these items often contaminate other mail delivered at the same time. Some people have had to leave such mail unopened for weeks or months just to avoid a potentially disabling reaction to the perfumes.

i. BETTER ACCESS TO THE CIVIL JUSTICE SYSTEM. Some of the problems facing MCS victims are the same as those facing any victim of toxic chemical poisoning, especially the problems dealing with the legal system. It is widely understood that the claims of toxic chemical victims are largely excluded from the tort system of our nation. Following are some of the general problems facing any true chemical victim:

--- It is frequently impossible, or impracticable, to develop necessary medical information to find a lawyer to take one's case, let alone to prevail in court.

1) Only a small percentage of chemical victims even know that they were harmed by a specific chemical - or even by chemicals at all. Many are told that their problems are caused by mental problems, stress, aging, alcohol or tobacco use, etc. Others are told that they and their friends will lose their jobs if they complain about any health problems. By the time most workers are unable to work they are so gravely ill and impaired that they are not able to undertake the major efforts needed to find competent counsel and medical assistance.

2) Information on the particular chemicals one was exposed to is often quite difficult to obtain and comprehend. Even so, the potential health effects reported on material safety data sheets routinely understate and/or omit hazards entirely. Without such information it is usually impossible to find competent

medical help.

3) According to a recent report from the National Academy of Sciences, there is a tremendous lack of trained physicians competent to diagnose occupational and environmental diseases. They don't even know which questions to ask.

4) If, in fact, people are harmed by numerous substances at numerous locations, they will likely never receive compensation.

5) Statutes of limitations often preclude the filing of a lawsuit because too much time has elapsed. Even more, many victims are unaware of the exceptions to these statutes and lawyers tend to shy away from cases where defendants have the ability to force them to spend a lot of time on such preliminary jurisdictional matters.

6) There is a major deficit of lawyers competent and willing to handle cases involving toxic chemicals.

The burdens thus facing chemical victims in our society are often unfair, if not insurmountable. Many different legislative and social actions will be required in order to remove some of this unfair burden from those who have succumbed to new and disabling illnesses. Some of these problems are more formidable than others. For the victims of indoor pollution, these problems are magnified. For those who also have MCS, they are frequently overwhelming.

--- People with MCS face additional problems in securing information and appropriate legal representation, medical evaluation and expert witnesses. Some of these difficulties are related to the limitations imposed by the illness: the lack of access to many public buildings; and the specific symptomatology of the illness, which generally includes impaired cognitive abilities.

However, the biggest obstacle is the type of prejudice which faces all victims of little understood illnesses. While the legal profession is becoming more aware of illnesses like MCS, the public still does not understand the problem. Thus, even if the attorney feels that the potential claimant has a case, he or she must base their decisions not on whether the plaintiff is an actual victim, but rather upon whether the judge and/or jury are sufficiently open-minded to this type of illness. Without clear government recognition of this problem, the reality of this strange and frightening illness just does not seem to impress our increasingly conservative juries.

Lawyers and physicians are understandably reluctant to become involved with these "difficult" cases. They have no ready answers and are frustrated by the enormity of the systemic biases and obstacles which are faced by these people. These cases are tough. MCS victims, due to their illness and the de facto discrimination they face do not tend to be easy to work with. Lawyers know that they can't make much money on a contingent fee case which will be extremely expensive to develop and will have only a small chance of success, anyway. As a result, many people [and I feel the vast majority] with valid claims for personal injury either never file suit, face summary judgment or procedural dismissal after perfunctory motions, or are dumped by their attorneys unless they are willing to accept a settlement of 5 or 10 thousand dollars for a lifetime disability.

I have talked to scores of people in these situations. They usually tell me that there is no justice in America. They look for "Perry Mason" but find only human beings with time and financial constraints who just can not "make the world right" for them. For these victims, indeed, there is no justice. They either need significant reductions in the burden of proof for personal injury cases, which could come from statutory changes or from meaningful government research recognizing these illnesses, or they need a new compensation system which will be more responsive to victims of novel illnesses.

CONCLUSION.

As you can see, chemical sensitivity disorders present serious challenges to our society. They require the development and integration of a wide range of new and existing information sources and vehicles for the delivery of needed services. They require research, innovation, flexibility, dedication, and, above all, compassion. The Indoor Air Quality Act of 1989 is a crucial first step in that process. Its letter and spirit should be supported by all Americans, both in terms of the Act's prompt passage and its subsequent implementation.

Again, I thank you for the opportunity to present this testimony.

LIST OF ATTACHED ARTICLES BY EARON S. DAVIS

1. "Potential Liability for Indoor Pollution," presented at the 1986 Annual Meeting of the Air Pollution Control Association.

2. "Ecological Illnesses," from the October 1986 issue of Trial, Association of Trial Lawyers of America, Washington, D.C.

3. "The Legal Side of Ecological Illness," from the Summer 1986 issue of Clinical Ecology, Denver, Colorado.

4. "The New Chemical Victims," from the July/October 1985 Ecological Illness Law Report, Wilmette, Illinois.

5. "Chemicals, Risk, and the Public," The Chicago Tribune, April 29, 1989.

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Statement of the

INTERNATIONAL COUNCIL OF SHOPPING CENTERS

on the

Indoor Air Quality Act of 1989
(S. 657)

Presented by:

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Partner
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to the

Subcommittee on Superfund, Ocean and Water Protection

of the

Senate Committee on Environment and Public Works

May 3, 1989

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SUMMARY OF STATEMENT

The members of ICSC want to provide safe and healthy indoor environments in their shopping centers, and ICSC supports efforts by the Federal Government to conduct research and disseminate information that will assist them in doing so.

Because building owners, occupants, and the public are highly sensitive to the potential health hazards of indoor air contaminants, the public dissemination by the Federal Government of health effects information regarding such contaminants likely will have an impact substantially similar to that resulting from the issuance of new regulations. Therefore, the manner of public dissemination of information on the potential environmental hazards of indoor air is critically important in determining whether such information contributes to or detracts from an effective and efficient response to such hazards.

Asbestos is the shopping center industry's largest environmental problem because of a widespread public misinterpretation of EPA's position on the health effects of asbestos on building occupants. The public misperception that the mere presence of asbestos in buildings presents a health hazard is causing asbestos to be removed where there is no health reason for doing so. Even scientifically accurate statements can cause the lay public to misinterpret the seriousness of a health risk unless sufficient information is provided to place the potential health risk in perspective. Great care must be taken in the dissemination of information about the health effects of indoor air contaminants to avoid creating problems similar to asbestos.

EPA's more recent dissemination of health effects information on radon provides an example of how EPA should disseminate health effects information on indoor air pollution. Such information should include:

1. the health risk at exposure levels typical in buildings;

2. a comparison of such risk to other risks of everyday life;

3. the health risks, technological feasibility, and cost of various remedial measures; and,

4. if at all possible, an "action level" above which EPA recommends that remedial action be taken.

Providing information that only indicates that a substance found in buildings is known to present a health hazard at some exposure level and that there is no known level at which there is no health risk likely will result in response actions that are environmentally unsound and economically wasteful.

I. Introduction

I am William H. McCabe Jr., a partner in New England Development, which develops, owns, and operates shopping centers and mixed-use facilities in several states.

I am also the Chairman of the Environmental Issues Task Force of the International Council of Shopping Centers (ICSC) and I am presenting this testimony on behalf of ICSC. ICSC has over 24,000 U.S., members who own virtually all of the 30,000 shopping centers in the U.S. These shopping centers employ almost nine million people and each month over 90 percent of all Americans over the age of 18 visit a shopping center. Shopping centers account for 54 percent of all nonautomotive retail sales, which amount to $584 billion yearly, and contain 3.7 billion square feet of leasable space.

ICSC appreciates this opportunity to present its views on the issue of indoor air quality and the Indoor Air Quality Act of 1989, S. 657.

ICSC wishes to make three points in presenting it's views on indoor air quality and legislation regarding that subject.

First, shopping center owners want to provide safe and healthy structures for shopping center occupants. ICSC supports efforts by the Federal Government to perform research and disseminate information that will assist ICSC members in this effort. Since ICSC does not have statistically significant data on the seriousness and extent of the health threat posed by exposure to contaminants in the air indoors, ICSC is interested in EPA's forthcoming report to Congress regarding such information.

However, based on ICSC's experience with asbestos, the shopping center industry's largest environmental problem, it is clear that information that is disseminated regarding the seriousness and extent of the health threat posed by exposure to a potentially hazardous substance can have counterproductive results if it is not sufficiently comprehensive. Therefore, the information disseminated must enable building owners and occupants to rationally evaluate the extent of the health risk of the substance, in comparison to other risks of everyday life, and to balance such risk against the potential health risks, technological feasibility, and cost of various remedial measures. Based on our hard won experience, information that only indicates that a substance found in buildings presents a health hazard at some exposure level and that there is no known level at which there is no health risk likely will result in responses that are environmentally unsound and economically wasteful.

Second, because of the sensitivity of building owners and occupants to the potential health hazards of indoor air contaminants, the dissemination of health effects information on indoor air contaminants likely will have an impact on the shopping center industry substantially similar to that of the enactment of a new regulatory program.

Third, the bill under consideration by the Subcommittee is essentially the same as that passed by the Committee in the last Congress. This legislation is a great improvement over the original bill introduced in the last Congress, but additional changes to or clarifications of the legislation are necessary in order to avoid the production of environmentally or economically counterproductive results.

II. The Dissemination of Health Effects Information

ICSC's views on indoor air legislation are primarily based on the experience of the shopping center industry with asbestos. The content and timing of the information disseminated by the governments at all levels about asbestos has contributed to a situation that is unsatisfactory from both environmental and economic perspectives. In contrast, the way information has been developed and disseminated about another indoor air contaminant, radon, appears to be much more satisfactory. We believe that indoor air quality legislation should be developed with the lessons of asbestos and radon in mind.

A. Asbestos

Asbestos has become a serious problem in many commercial buildings because of a misperception about the nature of the health risk created by the presence of asbestos-containing materials in buildings. There are tremendous market pressures to remove all asbestos-containing building materials regardless of their condition or their ability to be managed without the release of fibers into the air. Tenants are reluctant to lease space which contains asbestos. Prospective purchasers are reluctant to buy buildings containing asbestos and do so only at steep discounts. Some lenders have formal policies banning loans for any building with asbestos-containing materials. State regulators have adopted extreme positions on exposure levels in the absence of a Federally sanctioned level.

The response of many building owners to these pressures is to remove asbestos containing material as soon as possible, despite the fact that asbestos exposure levels in a properly managed building do not create an unreasonable health risk. Air tests by building owners and EPA show that asbestos exposure levels in buildings are very low, even in buildings with damaged

asbestos, and are virtually indistinguishable from the ambient asbestos levels in the air outside the building.

This environmentally unnecessary removal may have adverse environmental and economic effects. If removal is not done properly, it may increase the health risks of asbestos for abatement workers and building occupants. Improperly conducted transportation and disposal of the unnecessarily removed asbestos may create health risks. The installation of fibrous fireproofing and insulating materials commonly used to replace asbestos, such as fiberglass or rock wool, may present health hazards similar to that posed by asbestos. Finally, the enormous costs of the unnecessary removal of asbestos and the unjustified reductions in the values of properties which contain asbestos that poses no health risk and can be managed safely impede economic growth and tend to discredit legitimate environmental concerns.

These adverse consequences are primarily the result of the content and timing of the information regarding asbestos in buildings disseminated principally by the Federal Government in the form of legislation, regulations, and other health effects data, and the reporting of this information by the news media. Information that asbestos has been shown to cause fatal diseases at high exposure levels and that there is no known exposure level above zero at which there is no health risk has been disseminated by the Federal Government. This information has not been accompanied by information which clearly identifies the risk at various exposure levels, compares such risk to other risks of everyday life, and suggests at what low level asbestos does not present an unreasonable risk considering the risks and costs of removal.

B. Radon

Radon is similar to asbestos in most significant respects. Both are carcinogens (although radon is estimated to cause far more cancer deaths than asbestos) which may be present in a building, because of the manner of construction or the building materials used, without the knowledge of the building owner.

Without regard to these significant similarities, there has been a significant difference in the content and timing of the information disseminated about these substances by the Federal Government.

Last year, the Surgeon General and the EPA issued a health advisory regarding radon. While reporting that radon is a carcinogen with no known level of exposure at which there is no health risk, EPA also compared the health risks of radon at various exposure levels to other risks of everyday life. Also,

EPA indicated that an exposure level above zero (4 pico curies per liter) was an "action level" below which remedial actions were not recommended, although it made clear that there was a health risk below that level. EPA based the action level on the health risk at that exposure level as compared to other health risks and the technological feasibility and cost of mitigation below such action level. In conjunction with all this, EPA described a variety of practical mitigation actions, including their cost effectiveness, and limitations.

Last year, a law was enacted that provides specific direction to EPA on the dissemination of research information regarding radon. The measure set a "national long-term goal" of indoor radon exposures no greater than outdoor exposures, while recognizing that this goal is unattainable with present technology. The legislation also directs EPA to issue additional information on the health risk associated with radon exposure levels at a series of action levels below the "action" level set by EPA in its original radon health advisory.

ICSC supports the provision of more information regarding radon so that individuals can assess the significance of the health risk associated with various levels of exposure to radon and the feasibility of lowering the exposure levels. However, we believe that providing additional health risk information is not inconsistent with indicating an action exposure level that does not present an unreasonable risk given all the relevant information. In the absence of such a "reasonable risk" exposure level, uncertainty about the appropriate action to be taken regarding radon exposure levels may lead some building owners to inaction and others to action that may create health risks or be economically wasteful.

C. The Lessons of Asbestos and Radon

We believe that a number of valuable lessons regarding the development of indoor air quality legislation can be learned from the handling of the asbestos and radon issues. Some of these lessons are:

1. When a substance present in buildings is identified as a carcinogen at some exposure level, with no known exposure level at which there is no health risk, additional information must be concurrently provided to assist building owners and occupants in properly evaluating the health risk and in deciding upon an appropriate response. Otherwise, a misperception may be created that the substance presents an unreasonable health hazard whenever it is present in any concentration and must be totally eliminated in all cases.

2. Information must be provided indicating the level of health risk created by a substance at various exposure levels

typical in buildings and comparing such risk to other risks of everyday life. Where an estimate is made that there is no known threshold exposure level below which there is no health risk and the estimate is based on extrapolations, rather than on epidemiological evidence at the levels found in buildings, the extrapolation should be indicated and the scientific studies relied upon should be referenced.

3. Response actions appropriate at various exposure levels should be described at the same time a substance is identified as a potential health hazard. Detailed information about such response actions should be provided and should include the effectiveness, limitations (including any health risks of remediation actions), and costs of such responses.

4. EPA should be encouraged to suggest an acceptable exposure level for a substance, based on the health risk at that exposure level compared to other health risks and the technological feasibility, risk, and cost of remedial measures.

5. State and local governments should not be encouraged to act regarding a substance before EPA has provided sufficient guidance and support to them on which they can base the development of a reasonable and effective program.

III. The Impact of Dissemination of Health Advisories

The impact on building owners of the dissemination of health effects information was graphically demonstrated when the Surgeon General and EPA issued the health advisory on radon. This was one of the major news stories of the day with coverage focusing on three points: 1) there is a potential health hazard in many buildings that building owners and occupants should evaluate; 2) EPA has determined the extent of the risk at different exposure levels, has compared the risk at such levels to other risks of everyday life, and has suggested an exposure level to be used as a benchmark in evaluating a reasonable level of risk; and 3) EPA has identified appropriate remedial actions and provided guidance regarding their effectiveness, limitations, and cost.

We believe that the health advisories issued under indoor air legislation would have an impact similar to the issuance of the radon health advisory. The information would be immediately and widely disseminated to building owners and occupants and, as a result, would stimulate action by building owners, occupants, state and local government, and others to take remedial measures.

We believe that the content of indoor air health advisories would be simplified by the news media to make it understandable to the average person. This suggests that, as in

the case of asbestos, a health advisory which states that there is no known exposure level to a substance at which there is no health risk and does not set forth an "action level", i.e. a level at which there is no unreasonable risk, will create pressures for the total removal of the substance regardless of the advisability and cost of such removal.

IV. Indoor Air Quality Legislation

Therefore, the Committee should draft indoor air legislation with the understanding that health advisories will not only be used by scientists and building professionals, but will stimulate and guide action by building owners and occupants upon their release. Thus, health advisories, as in the case of radon, should contain complete information on the risk, including a comparison to other risks, a suggested exposure level at which no unreasonable risk exists, and a description of remedial measures, including their effectiveness, limitations, and cost. The publishing of health advisories without such requirements risks the creation of a series of "asbestos" problems.

The radon health advisories should be used as a model of what should be done. EPA's dissemination of information on asbestos should be model of what not to do.

The overriding consideration in evaluating any provision of an indoor air quality bill should be whether it contributes or detracts from a rational and appropriate response to the potential health risks of indoor air contaminants. Information about the health effects of indoor air contaminants should reduce uncertainty about the nature and extent of health risks of a substance. It should describe the risk at various concentration levels and exposure durations, for different exposure groups with other environmental factors. This information should be based on the latest scientific evidence from all credible sources. Extrapolations made to estimate risk at exposure levels where there is no epidemiological evidence should be indicated as such, and scientific studies relied upon should be referenced for further study.

Also, information about remedial actions should reduce uncertainty about the appropriate response action under specified circumstances. It should explain the effectiveness, limitations, and costs of each response action.

In developing indoor air quality legislation Congress should direct EPA to provide all of the information described above, should establish reasonable timetables, and provide sufficient funds to enable EPA to do the job properly and expeditiously.

A. Comments on the Indoor Air Quality Act of 1989, S. 657

Several provisions of S. 657 should be amended or clarified as follows in order to avoid the creation of the problems discussed above.

1. Technology and Management Practice Assessment Bulletins

The bill provides for the publication of Technology and Management Practice Assessment Bulletins. This is an essential feature of a program that provides health effects information on indoor air contaminants. ICSC strongly supports requiring the issuance of such bulletins.

However, the bill provides that such bulletins "shall be published on a schedule consistent with the publication of health advisories ... to the extent practicable [Emphasis added]." This requirement is inadequate since the provision of building owners with guidance on remedial actions concurrently with health effects information is vital to avoid unnecessary and expensive responses. Otherwise, the public will be given information that a substance is an indoor air pollutant, that it is hazardous at some level, and that (for carcinogens) there is no safe level, but will not be given information on how they should respond to the presence of such contaminant in their building.

This provision should be amended to provide that, absent extreme and compelling circumstances, EPA must publish a Technology and Management Practices Assessment Bulletin concurrently with the publication of a health advisory on a substance.

2. Health Advisories: Current Scientific Information

The bill requires that health advisories be based on "the most current available scientific and related findings or information and shall be reviewed, revised, and republished to reflect new scientific information" periodically and no less frequently than every five years. ICSC supports this requirement.

However, the bill also should make clear that "available information" includes not only U.S. research but also credible research from other countries where it is available. For example, the research on the differential health effects of different asbestos types and fiber sizes, some of it from foreign researchers, should be incorporated into the health advisory on asbestos.

3. Health Advisories: Timing and Funding

It is crucial that an indoor air quality program be implemented properly. This requires that the timetable for EPA's production of Heath Advisories and Technology Management Practice Bulletins be coordinated with the provision of funding and personnel to EPA for these tasks.

The Subcommittee should consider whether the number and timing of health advisories required by the legislation, i.e., six within the first eighteen months and another six in the subsequent eighteen months, is practical at the funding levels provided in the bill, at least at the level of quality that the subject requires. It would be counterproductive if time and budgetary pressures forced EPA to merely repackage existing research for the Health Advisories and to fail to publish the Technology and Management Practice Assessment Bulletins concurrent with the issuance of the related Health Advisory.

4. Health Advisories: Public Review and Comment

The bill provides for public review and comment regarding both the list of indoor air contaminants to be assessed and the Health Advisories. While the bill clearly requires that comments be considered by EPA before issuance of the final contaminants list, it is not clear that EPA is required to consider the public comments prior to the issuance of the Health Advisories.

The bill should make it clear that proposed Health Advisories should be published in the Federal Register 90 days prior to the date of the intended final publication of the Health Advisory, and that public comments on such proposed Health Advisory will be considered by EPA prior to its final publication.

In addition, the Technology and Management Practice Bulletin that is to accompany a Health Advisory should be made available in the Federal Register in proposed form for industry comment 90 days prior to its final publication.

5. Health Advisories: Priorities

The bill does not suggest a method for EPA to set priorities in the production of Health Advisories. Congress should require EPA in producing Health Advisories to give priority to substances, such as asbestos, that currently are being dealt with by building owners.

The same priority-setting requirement should apply to grant assistance for state programs.

6. Health Advisories: Contents

The bill specifies the contents of the Health Advisories. In one provision, the bill requires an analysis of the health risk at various concentrations, and in another, separate provision of the bill requires the establishing of the concentration level at which there is "no known or anticipated human health effect, with an adequate margin of safety." The use of a separate provision for the "no known health effect" exposure level may give rise to an interpretation that any amount of substance presents an unreasonable health risk and, therefore, it must be removed in all cases.

These separately stated requirements should be combined into one provision to make it clear that the exposure/risk analysis must show the relationship between exposure and risk at all levels, all the way down to a zero level.

Also, in addition to stating the risk at various exposure levels, a Health Advisory should compare such risk levels with the other risks of everyday life so that building occupants can put the risks in perspective.

7. Health Advisories: Low Level Extrapolations, Studies

The Report of the Senate Environment and Public Works Committee on S. 1629 (Committee Report), the identical bill reported by the Committee in the last Congress, states that EPA shall indicate when anticipated health effects at low concentrations are extrapolations from health effects at the low concentrations. This requirement is extremely important because it allows interested parties to properly evaluate a Health Advisory. Therefore, this requirement should be included in the legislative language of S. 657.

The Committee Report also directs EPA to reference in a Health Advisory the scientific studies on which the Health Advisory is based. This requirement is important for the understanding of a Health Advisory and should be included in the legislative language of S. 657.

8. Building Assessments

The Committee Report recognizes the potential misuse of requests for building assessments and seeks to minimize such abuse by limiting those who may request building assessments to those with a significant stake in the building and knowledge about it. The Report also states that building assessments are not intended to provide competitors, or others with an economic

or other dispute with the building owner, a method of harassment. These concepts could be included in the legislative language.

An issue of concern regarding building assessments is that NIOSH inspectors may make recommendations regarding measures to reduce exposure to a substance before EPA has issued a Health Advisory or a Technology and Management Practice Assessment Bulletin regarding the substance.

Inspectors should be required to follow applicable Federal environmental or occupational regulations in recommending control measures where they exist. Where there are no such regulations, the legislation is unclear as to what should guide inspectors in making recommendations regarding the control of a substance. This gap creates the possibility of inconsistent or inappropriate control recommendations in the building assessment process. Some uniform guidance should be provided inspectors in this situation.

V. Conclusion

The production and dissemination of information about indoor air contaminants should be expected to have an immediate and wide ranging impact on the actions of building owners and occupants. Depending on the completeness and timeliness of the information provided, this information can result in safer and healthier buildings or can lead to environmentally and economically counterproductive action. The Subcommittee should evaluate the provisions of indoor air legislation with the problems that have been created regarding asbestos in mind and should seek to avoid the creation of similar problems regarding other substances.

Thus, the bill pending in the Subcommittee should be amended or clarified as suggested above to insure that information disseminated pursuant to this legislation will advance, rather than detract from sensible environmental and economic policies.

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May 25, 1989

Senator Frank R. Lautenberg
Chairman, Subcommittee on Superfund, Ocean, and Water Protection
Committee on Environment and Public Works
United States Senate
Washington, DC 20510-6175

Dear Senator Lautenberg:

Thank you on behalf of Lawrence Berkeley Laboratory for the opportunity to submit testimony on the Indoor Air Quality Act. As director of the portion of the Laboratory in which work on indoor pollutants is performed, Director Shirley has asked me to respond to your invitation.

We at Lawrence Berkeley Laboratory consider the problem of indoor air quality to be extremely important, as indicated by the substantial program of research in this area that has been conducted by our Indoor Environment Program for more than a decade. The scope of this work has been broad, examining the origin, concentrations, and behavior of major classes of pollutants, including radon, combustion emissions, and volatile organic compounds, as well as their dependence on building-related factors, including energy conservation measures. Significant attention has also been given to human exposures to these pollutants and to the corresponding health risks. As an indication of the scope of these efforts, I include a bibliography of articles from staff of the Indoor Environment Program, as well as two articles that address broad issues of the indoor environment and about indoor radon in particular. This work has been supported primarily by the Department of Energy (DOE), which for more than a decade has had a substantial research effort on indoor air pollution and its dependence on structural and operational factors. Our work has also been supported by other agencies, such as the Environmental Protection Agency (EPA) and the Consumer Product Safety Commission (CPSC).

Our substantial experience has made us well aware of the exposures and health effects occurring inside different types of buildings. We strongly support a concerted effort to understand the behavior of indoor air pollutants and the resulting degree of risk, along with the development of a plan for responding, where appropriate, to these risks by developing guidelines and methods for control. The risks from indoor pollutants are often larger than those deemed acceptable in outdoor air, and thus deserve substantial attention. In fact, the risks attributed to indoor pollutants approach those from accidents in our homes, cars, and industrial workplaces, or from industrial exposures to toxic chemicals.

Based on our experience, we are pleased to offer some comments on the proposed Indoor Air Quality Act.

A great deal is already known about the origin, behavior, and risks of various classes of indoor pollutants. This knowledge will serve as the near-term basis of control programs. Continuing research will provide the underpinning of these programs as they develop over the years. It is therefore important that the best possible use be made of present knowledge and existing capabilities, and that any broader program at EPA grow together with and enhance those capabilities, rather than ignore or even simply "coordinate" with them. The purposeful use of existing capabilities will speed research efforts and make them more efficient, thus avoiding dislocations in the scientific community and requiring smaller expenditures for research and control efforts.

Accomplishing this in the proposed Indoor Air Quality Act means acknowledging and encouraging important research efforts carried out by agencies other than the EPA in fulfillment of their respective missions. For example, the mandate of the Department of Energy in this area should be "to investigate the relationship between building design features, particularly those related to energy use, and indoor pollutant concentrations and health risks, as well as to study means to reduce excessive exposures." We do not presume to suggest the corresponding mandate for other agencies, but note, for example, that the Consumer Product Safety Commission has comparable responsibilities for the products that enter homes and other occupied spaces.

We suggest that the proposed legislation not only affirm such agency mandates as part its overall intent, but require EPA to 1) use national resources and capabilities rather than attempt to supplant them and 2) augment and enhance existing capabilities to fulfill the broader purposes of this legislation. We believe that such changes would make the Federal program on indoor air quality more effective and less costly. I also note the difficulties that can arise when a regulatory agency is charged with the prime responsibility for developing the information required for its regulatory mandate. (An example is the problems faced by the Atomic Energy Commission before the creation of the Nuclear Regulatory Commission.)

Aside from these general needs, which could be implemented both by alteration or addition of specific provisions in various portions of the Act and by an expression of Congressional intent, I note two or three specific places in the Act that should be modified to be consistent with this intent:

1. Section 5 (b)(19), which charges the Secretary of Housing and Urban Development with developing methods for assessing radon potential and design measures for avoiding indoor air pollution, should also mention the Department of Energy, given its substantial activities and responsibilities in these areas. (Incidentally, part (A) ought to refer to "permeability," rather than "porosity," since it is the former that affects radon entry substantially.)

We also note that the omission of any reference to the responsibilities of DOE also occurred in last fall's "Indoor Radon Abatement"

amendment to the Toxic Substances Control Act, even though DOE and the EPA have an explicit memorandum of understanding with regard to respective responsibilities on indoor radon (dated September, 1987), and DOE programs continue to provide much of the basic research underlying our understanding of and response to the problem of indoor radon.

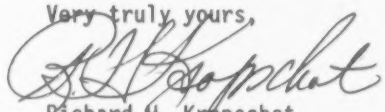
2. Section 6 (c), refers to ex officio members of the Indoor Air Panel. We suggest that it should also include ex officio representatives of the Department of Energy's Office of Health and Environmental Research and the area within the Consumer Product Safety Commission that deals with problems of indoor air quality.

Pinpointing all the provisions of the Act that should be changed to reflect an integrated Federal approach to the problem of indoor air quality would require more detailed consideration that we can provide here. If appropriate, this could be developed by scientists here at the Laboratory working with your staff and those at DOE, CPSC, and EPA.

Finally, indoor pollution occurs in a setting for which there is so far only a partially developed perspective on the nature and acceptability of risk and on strategies for control. Thus, the goal of section 6 (b) (D), which requires that health advisories specify a pollutant concentration with no human effects, with an adequate margin of safety, is not clearly possible. Such issues have to be considered more systematically if we are to establish a sound and lasting basis for dealing with the problem of indoor air pollution. The criterion for acceptable concentrations might - at least for the present - focus on identification and remediation of situations where levels are substantially higher than normal. This appears to be the best near-term approach for radon, as well as other pollutants for which quantitative estimates of risk have been made. You may wish to reconsider the precise phraseology for concentrations discussed as part of control efforts.

Again, I would like to thank you on behalf of the Laboratory for the opportunity to submit written testimony on the Indoor Air Quality Act.

Very truly yours,



Richard H. Kropschot
Associate Laboratory Director
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Enclosures

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Mortgage Bankers Association of America

STATEMENT OF

MORTGAGE BANKERS ASSOCIATION OF AMERICA

SUBMITTED FOR THE HEARING RECORD ON
S 657, "THE INDOOR AIR QUALITY ACT OF 1989"

SUBCOMMITTEE ON SUPERFUND, OCEAN AND WATER PROTECTION

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE

May 3, 1989

1

The Mortgage Bankers Association of America (MBA)* appreciates this opportunity to present the Subcommittee with its views on S 657, the "Indoor Air Quality Act of 1989," and the issue of indoor air quality. MBA shares the Subcommittee's concern regarding the impact of the indoor air environment on public health, and applauds its effort to address the issue by beginning hearings in this session. The Subcommittee's action on this issue is timely. The hazards of indoor air pollution have been with us for many years. However, the number and kind of potentially hazardous pollutants emitted into indoor air, which can permanently or temporarily damage human health, has increased in recent years. Ineffective ventilation systems can hinder evacuation of emissions from the many new chemicals and substances used in building materials, as well as household and office products. Design and construction techniques implemented in the 1970s to achieve greater energy efficiency have resulted in the retention of both pollutants and natural indoor air hazards, such as radon.

MBA's interest in the indoor air issue stems from a genuine concern about public health. We also recognize that indoor air problems may affect property on which lenders hold liens or have equity positions, and may require financing for mitigation which can need a significant expenditure of funds. Our members provide short and long term financing for properties, and thus serve as (1) lenders (and sometimes equity participants) who provide capital for new construction and acquisition, (2) holders of security interests on existing properties which may or may not have indoor air problems, (3) a possible source of financing for abatement or mitigation actions that require a significant expenditure of funds and (4) possible owners of properties if a default occurs. Thus, although our interests are often less direct than managers who deal with tenants on a daily basis, we do address environmental concerns both at the time of transactions and where mitigation is necessary on properties on which we hold liens.

Consequently, we have an interest in the framework of indoor air legislation. MBA supports the thrust of S 657, but as discussed below has some particular concerns about the impact of this indoor air proposal on the public's perception of indoor air problems, and consequent consumer demands on the real estate market.

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*The Mortgage Bankers Association of America is a nationwide organization devoted exclusively to the field of housing and other real estate finance. MBA's membership comprises mortgage originators and servicers, as well as investors, and a wide variety of mortgage industry-related firms. Mortgage banking firms, which make up the largest portion of the total membership engage directly in originating, selling, and servicing real estate investment portfolios. Members of MBA include:

- Mortgage Banking Companies
- Commercial Banks
- Mutual Savings Bank
- Savings and Loan Associations
- Mortgage Insurance Companies
- Life Insurance Companies
- Mortgage Brokers
- Title Companies
- State Housing Agencies
- Investment Bankers
- Real Estate Investment Trusts

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S 657 THE INDOOR AIR QUALITY ACT

S 657, "the Indoor Air Quality Act," represents a positive attempt to address a serious problem. The bill will encourage research on indoor air contaminants and new approaches to indoor air problems.

MBA concurs with the research goals of the bill and, in fact, has already begun to participate in industry efforts in that regard. In August 1988, MBA contributed funds to an indoor air research project--a joint EPA/private sector study funded in the Department of Housing and Urban Development and Independent Agencies Appropriation Act for FY 1989 (P.L. 100-404). We hope that this study, designed to determine actual airborne exposure levels prevalent in buildings, to characterize peak exposure episodes, and to evaluate the effectiveness of asbestos management and abatement strategies will provide us with useful, practical information to help us all address asbestos problems in indoor air. The initial report prepared by the Health Effects Institute which became available in March provides some encouraging research. Our members are hopeful that the research conducted under this program will help lenders respond to the problem of asbestos in public and commercial buildings in an informed and ultimately productive manner.

S 657 does recognize that there is a developing body of scientific and technical building expertise, but, as it is still evolving, achievement of standards could be difficult. Consequently, MBA believes that directing EPA to provide guidance through such mechanisms as Indoor Air Health Advisories rather than through a regulatory program, is appropriate. However, we are concerned, as discussed below, that the effect of the health advisories to be issued under Section 6 would be similar to a regulatory program because the public would demand a response.

The Indoor Air bill will encourage new research and dissemination of new information. The technology management practice bulletins, authorized by Section 5(d) of the bill, will help in particular to make that information available. S 657, as currently proposed, however, does not require that health advisories authorized under Section 6 of the bill contain technological information, and there is no link in timing between the health advisories and the technology management practice bulletins. Therefore, those who examine their properties for indoor air contaminants, will not, on the basis of the bill's health advisories, have the information available to consider appropriate mitigation or abatement actions at the time tests are conducted or in the same resource document.

Consequently, MBA believes that legislation which takes a more comprehensive approach to the problems of indoor air may best meet the Subcommittee's goals.

We suggest that the Subcommittee consider an approach to indoor air must would provide information on health effects, but would shift the focus of the bill also to providing information on appropriate technologies. Having such information available would facilitate abatement and mitigation.

MBA is appreciative that the legislation has been revised from that originally introduced in the 100th Congress, and that health advisories will be available for public review and comment before they are issued. We hope that the industry may be able to provide helpful comments on those health advisories based on its own experiences, which will serve to produce useful documents at the time of release.

Despite this review and comment provision, we believe that the advisories will stimulate significant concern among the general public. Section 6 of HR 5373 directs the EPA to issue health advisories which: describe contaminants; identify the adverse human health effects of and risks posed by the contaminants; identify the concentration of the contaminant at which there is no known or anticipated human health effect, with an adequate margin of safety; and identify any indoor air contaminant standards. We are concerned that this "health effects" definition may create a particularly alarming document, and ask the Committee to consider simultaneously presenting the public with more information on abatement costs and comparable risks.

It is unlikely that development of technology to address indoor air problems will occur in the same time frame as pollutants are determined and a health advisory released. We are thus particularly concerned about the presentation of information in those health advisory materials, and the effect any shortage of technology and qualified personnel may have on safe and timely mitigation of hazards on which advisories are issued.

We also suggest that the Subcommittee consider developing alternatives to the "anticipated human health effect with an adequate margin of safety" provision of the health advisory. Given the present market reaction to such environmental hazards as asbestos, we hope that this information will be as detailed as possible, and that the health effects guidance will reflect technologically feasible goals.

The advisories should be developed with the intent to (1) inform the public fully of all the risks and costs of environmental indoor air hazards, and (2) assist the real estate community to be technologically capable of addressing the problem, and thus able to address public concerns. Advisories which alarm the public would be impractical if knowledge of the appropriate mitigation techniques is unavailable.

CURRENT REAL ESTATE EXPERIENCE

Our present perception of the potential effect of these advisories is affected by the real estate community's experiences with asbestos and radon, two of the substances for which EPA is expected to issue health advisories. As a result of recent media presentation of the hazards associated with these contaminants, public reaction to the problems of asbestos and radon has not been entirely productive from either a public health or resource allocation perspective. Health advisories issued in accordance with the guidelines established in Section 6 would, we believe, exacerbate present problems.

Asbestos. Asbestos has been identified as a carcinogen for which EPA assumes that there is "no known safe level" in indoor air. Because of that EPA position, there has been a significant consumer, and consequently market, "reaction" to the presence of asbestos in public and commercial buildings. Real estate lenders must take into account the effect of removal, if appropriate, on real estate values, and potential liability problems as well.

Despite the fact that EPA has specifically indicated that the appropriate response to nonfriable asbestos may be containment, market forces, e.g. tenant reluctance to inhabit spaces containing asbestos, often require that asbestos be removed from commercial space. Lenders and owners are presently uncertain whether removal or abatement is appropriate, despite the existence of EPA's Guidance for Containing Asbestos (the Purple Book) June 1985, and Federal standards under the Asbestos Hazard Emergency Response Act. Market demands for asbestos free buildings have been exacerbated by a shortage of qualified,

competent personnel. For instance, in New York City, where much asbestos removal takes place in conjunction with renovation, substantial delays are presently being encountered, and asbestos removal costs approach $50 per square foot. Because there is only one hazardous waste dump in New York which accepts asbestos, disposal problems are exacerbated. In fact, the Lincoln tunnel was closed twice due to asbestos dumping last year.

Under the present scheme described in Section 6 of the bill, an asbestos health advisory would state that there is no known safe level of asbestos. This could confuse the public and conflict with an EPA guidance document that recommends containment of nonfriable asbestos.

Radon. MBA members have identified radon as a growing consumer and public health concern. Until the fall of 1988, concern with radon hazards had been prominent in only certain areas of the country where radon was prevalent, e.g. in the areas surrounding the Reading prong and in Colorado. MBA was aware of selected instances where potential mortgagors had requested radon testing. Many of our members, as well as consumers, became familiar with the EPA Citizen's Guides to Radon, and Radon Reduction Methods A Homeowner's Guide."

In September of last year, Dr. Vernon J. Houk, Assistant Surgeon General of the Public Health Service issued a national advisory identifying radon as a national health problem and urging the testing of most homes in this country for radon. As a result of the substantial media coverage of this advisory, lenders found that consumers were frequently inquiring about the presence of radon and were more likely to have homes tested for radon. In contrast to asbestos, consumers can test for the presence of radon on their own through use of such items as affordable charcoal canister kits. Radon mitigation can also frequently be performed by the consumer on the basis of EPA guidance. The availability of substantial knowledge and information on the risks of radon, provided in the EPA's Citizen's Guide and Radon Reduction Guide, in combination with the ease of consumer testing and mitigation, has served to produce, on the whole, productive consumer responses.

For radon, EPA's Guide presents a risk evaluation chart which shows the risks associated with exposure levels, as well as the risks associated with other causes of lung cancer. Consumers can, based on that information, make informed choices to determine their appropriate response. The Guide also provides useful information regarding the range of approaches that are recommended based on various levels of radon contamination, factors to consider, and authorities with whom to consult in determining the appropriate response. Suggested action levels take into account factors such as technological feasibility and cost. In addition, the EPA booklet on Radon Reduction Methods for Homeowners also provides practical useful information for homeowners who do decide to mitigate. However, none of this information would be provided in a radon advisory issued under the requirements imposed by S 657.

CONCLUSION

MBA is finding that consumers are aware of the health hazards associated with exposure to contaminants, such as radon and asbestos, and are taking concrete actions to address the problems. However, we also recognize that in some instances we are encountering significant problems in attempting to address these hazards.

Thus, the Subcommittee should consider how these advisories will affect those concerns and needs, and we suggest that the Subcommittee consider the radon model as a precedent for Indoor Air health advisories should they be included in the bill. We are encouraged that the Subcommittee is taking a deliberate approach to this serious problem, and look forward to working with the Subcommittee on further improvements to this legislation in this Congress.

STATEMENT OF

THE NATIONAL ASSOCIATION OF HOME BUILDERS

before the

SUBCOMMITTEE ON SUPERFUND, OCEAN AND WATER PROTECTION

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

of the

UNITED STATES SENATE

on

S.657, THE INDOOR AIR QUALITY ACT

May 23, 1989

The 157,000 member firms of the National Association of Home Builders (NAHB) are pleased to have the opportunity to comment on the status of indoor air pollution and S.657, legislation to authorize a national indoor air quality program.

Indoor air quality (IAQ) is gaining recognition as a significant environmental concern -- especially among the nation's home builders. Due to the significant changes in house design, construction materials and house accessories, there are many products such as plywood, flakeboard, foams, synthetic based furniture, and carpets -- which may contribute to the phenomenon of indoor air pollution. In addition, the introduction of new products and chemicals into the home environment may increase the number of indoor air contaminants such as paint, solvents, cosmetics, cooking fumes, and insecticides.

NAHB would like briefly to review its current programs and educational activities, especially highlighting its commitment to research and innovation in the area of IAQ.

THE NAHB NATIONAL RESEARCH CENTER (NAHB/NRC)

Established in 1964, the NAHB/NRC formerly was known as the NAHB Research Foundation, Inc. -- it has since grown in size and function. In 1986, NAHB/NRC moved into a modern research facility specially designed and constructed to accommodate its equipment and programs. The NAHB/NRC facility is located in Prince George's County, Maryland.

The NAHB/NRC helps American home building firms to reap the benefits of technological progress and change. Over the years the research performed by the center has increased savings in residential construction, rehabilitation and land development -- all of which helps to address the problem of housing affordability. Much of the center's success has come as a direct result of working closely with builders who offer their ideas on improving construction practices. Some of the center's most recent projects and educational programs have focused on IAQ:

PILOT FORMALDEHYDE TESTING PROJECT

- The NAHB/NRC has conducted a pilot study of formaldehyde levels in homes under construction for NAHB. The primary purpose of this study was to determine construction workers' exposure to airborne formaldehyde (HCHO) while working in enclosed, but unfinished, homes under construction.

BETTER BUILDINGS CONFERENCE (February 27-28, 1989)

- The Better Buildings Conference: Residential Energy and Indoor Air Quality was conducted by the NAHB/NRC for the New York State Energy Office. The conference provided a forum on the latest trends aimed at practical solutions to the indoor air quality problems in new buildings and retrofits.

PILOT STUDY OF FORMALDEHYDE IN MOBILE HOMES

- This study was designed to determine formaldehyde in mobile homes built to the Department of Housing and Urban Development (HUD) code. The objective was to check compliance with HUD IAQ standards.

CURRENT RADON ACTIVITIES

- CLEARINGHOUSE: Currently in its fourth year of operation, the NAHB/NRC now has an on-line data base read-out capability on radon information and technical papers. In addition, over 100 radon seminars have been held throughout the country and NAHB/NRC has assisted over 8,000 builders, designers, building officials, and realtors with radon related questions.

- HOME EVALUATION PROGRAM (HEP): This is a recently funded program to analyze the provision of radon mitigation in new homes from the soil on the lot to the finished home's measured indoor radon levels. EPA funding will lead to results from fifty homes nationwide. There currently exist tentative projects in eleven states.

- NEW JERSEY RADON PROGRAM: The goal of this program is to analyze the performance of low cost radon resistant construction techniques. Preliminary results are now coming in for analysis and reporting. This project is jointly funded by the New Jersey Builders Association, EPA, and Jersey Central Power and Light.

- LEAD INDUSTRY ASSOCIATION: Work is underway to evaluate the effectiveness of a lead sheet shield against soil radon gas. The work is being conducted in Florida where the costs of a subslab ventilation system is high.

- The NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA) has funded an effort to produce a radon guide. Entitled Radon Resistant Foundation Design Handbook, it is nearing completion by the Information Technology Division of the NAHB/NRC. This guide will contain both general recommendations and specific guidelines for foundations that are constructed of concrete masonry block.

- ASTM Standard Guide; a first draft "white paper" on Radon Control Options for New Home Construction has been issued for review. Comments were solicited for a June 1, 1989 closing date, after which a second draft will be released for broader distribution. The NAHB Radon Task Force had a large role in preparation of the original materials.

In addition, the NAHB/NRC has initiated an IAQ Surveillance Project. The purpose of this project is to review the current state of the art in indoor air quality, other than radon gas, and determine the areas of greatest concern to the residential and light construction industry. Particular focus will be on sources of indoor pollutants and on standards, codes, and legislative developments. NAHB desires to learn as much about the issues as possible, and develop a sustainable program on IAQ in order to serve as an authoritative, industry-based source of knowledge to assist the regulatory and legislative efforts.

The results of this program will include:

- Report on indoor pollutants in typical residential and light construction.

- Review of current standards, codes and legislative activities.

- Create an extended outline for a Builder's Guide to the Design, Construction and Operation of Healthy Homes.

- Support distribution of all information through NAHB.

NAHB POLICY ON INDOOR AIR QUALITY

In 1983, NAHB went on record as opposing regulations that would establish "restrictive and unreasonable" ambient air quality standards; directing its staff to "expend every effort" to assist in determining reasonable air quality levels for indoor air; and resolving that NAHB would seek to make compliance with any such standards voluntary -- not mandatory." The NAHB Board of Directors concluded that, at the time, air contamination levels as proposed by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), the Consumer Product Safety Commission (CPSC) and the Building Officials and Code Administrators International, Inc. (BOCA) would increase housing costs without providing "commensurate" benefits. This policy was reaffirmed by the NAHB Board of Directors in May 1987.

In September 1984, NAHB developed the following new policy, which was reaffirmed in May 1988: Recommended that NAHB and the NAHB/NRC evaluate the indoor air quality issue and identify potential sources of funds for future research efforts. The Board further recommended that the evaluation of current indoor air studies include documentation of health risks; levels of indoor air pollution in typical homes; existing standards and practices in other countries; standard test methods; methods for eliminating, mitigating, or satisfactorily controlling indoor air pollutants; and documenting toxic chemicals related to building materials and home furnishings -- all within the context of preserving the integrity of energy-efficient, affordable housing.

As part of its evolving policy on IAQ, and partly in response to passage of S.1629 by the Senate Environment and Public Works Committee during the 100th Congress, NAHB further expanded its policy during the January 1989 Board of Directors meeting.

The Board recognized that there is a great deal of IAQ activity within federal, state, and local governments and agencies -- even though much of this activity is being carried on in the absence of comprehensive data and reliable testing procedures. Therefore, the Board went on record in support of an expanded research effort to evaluate the IAQ issue and support efforts to have research regarding residential housing performed by private sector industry research organizations.

In addition to the revised IAQ policy, as part of its ongoing efforts to provide its members with the up-to-date technical information on IAQ, an Indoor Air Quality Subcommittee has been established within the Standing Committee on Research. This newly formed IAQ Subcommittee met during the recent NAHB Spring Board of Directors Meeting to set an agenda and coordinate

all of NAHB's IAQ activities.

NAHB builders simply want to build safe, healthy, energy efficient and affordable housing. Accordingly, home builders are trying to keep abreast and aware of the rising concerns about indoor air quality and are prepared to do their share in addressing the problem. However, builders are concerned about being forced to institute corrective or preventative measures that may not be effective or are based on faulty assumptions and data, especially in light of the liability consequences of doing something that is ineffective or does not correct the perceived problem.

Many research activities are underway to assess the nature and extent of health consequences for the population as a whole. Findings to date have confirmed that: there exists a wide ranging source of pollutants indoors; there are cases where indoor pollutant concentrations have exceeded outdoor levels and outdoor air quality standards; and since the population as a whole spends much of its time indoors, there may be a potential for negative health impacts. However, more research needs to be done.

Meanwhile, federal and state legislative agencies are proposing and adopting new legislation and regulations; model building codes are experiencing an increase in proposed changes to address IAQ; and some private sector manufacturers and entrepreneurs are developing products, testing methods and promotional material claiming solutions to the problem of indoor air pollution. NAHB believes that much of this activity is being done without good data. Yet, much research still needs to be done to ensure that whatever measures are adopted are prudent and responsible.

COMMENTS ON S.657

NAHB believes that much research still needs to be done to ensure that whatever IAQ measures are adopted are prudent and responsible. Accordingly, NAHB is encouraged that Congress is taking a non-regulatory, research-oriented approach as currently drafted in S.657 -- NAHB strongly supports the research portions of this legislation.

However, NAHB is concerned about the proposed "National Indoor Air Quality Response Plan" contained in section 7 of the bill. Specifically, while most of the response plan seems reasonable, the proposed development of model building codes, section 7(c)(5), should not be solely in the hands of the EPA. NAHB would encourage that HUD have a strong role in the development of these codes. Moreover, NAHB's experience in assisting with the development of the radon construction

techniques, as contained in EPA publications such as "Radon Reduction in New Construction: An Interim Guide," demonstrated that a consensus process was far better than sole-source development.

NAHB believes that the development of model building codes should occur within the long-established building code groups, whereby concerned industries, such as NAHB, would have the opportunity to bring to bear their experience and research capabilities. NAHB believes that the approach taken in S.744, (The Indoor Radon Abatement Act of 1988/Public Law 100-551), with regard to working with the model building code organizations, is the appropriate path of cooperation. As stated in the committee report on S.744, section 30, page 16:

> In developing the model construction standards and techniques, EPA must make every effort to seek the assistance of the organizations normally involved in establishing such national standards and techniques. The Committee understands that almost all new building construction in the United States is regulated by the model building codes. The Committee's hope is to see the model construction standards and techniques incorporated into the national building codes, which in turn will be used by State and local communities.

Section 9, "State and Local Indoor Air Quality Programs," is also of concern to NAHB.

NAHB realizes that the states should be consulted, since there is much expertise at the state level. This is particularly true regarding indoor air quality where geographic differences need to be taken into account However, only one level of government, the federal government, should have the sole authority to address this issue with technology, management, and measurement practices -- with opportunity for comment given to the states.

Establishing a system of state plans, subject to EPA approval, could very well lead to conflicting requirements among the various states. NAHB does not believe, that as currently drafted, the standards for EPA approval detailed in section 9(c) may be clear and strict enough to avoid potential problems.

Furthermore, NAHB believes that the possible creation of fifty different state approaches is not the most effective manner in which to address IAQ. State implementation plans may have been appropriate to address outdoor air due to different industrial, transportation, and geographic variances, but the parallel does not always exist in the indoor environment.

NAHB believes that, because any codes changes or federal legislation/regulation will directly affect the housing industry, the home building industry and HUD should be directly involved in the development process. NAHB and NAHB/NRC have a very positive working relationship with EPA and our experience in working together on the radon issue is a testament to this fact.

Our members have a great deal to offer with regard to the experience and knowledge and ours is an industry that has always prided itself on providing the safest, best-built, affordable and technologically advanced housing possible.

We look forward to offering whatever assistance we may during the debate on S.657. Thank you for allowing us the opportunity to express our views.

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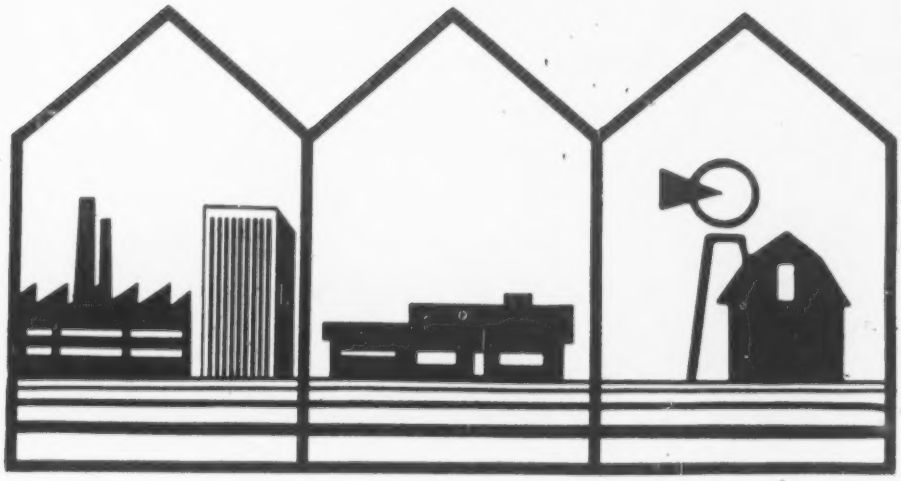


Statement of the

NATIONAL ASSOCIATION OF REALTORS®

THE WORLD'S LARGEST TRADE ASSOCIATION

TO: SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
SUBCOMMITTEE ON SUPERFUND, OCEAN AND WATER PROTECTION

SUBJECT: S.657, ESTABLISHING AN EXPANDED INDOOR AIR QUALITY PROGRAM WITHIN THE U.S. ENVIRONMENTAL PROTECTION AGENCY

DATE: MAY 3, 1989

WRITTEN STATEMENT OF THE

NATIONAL ASSOCIATION OF REALTORS®

ON INDOOR AIR QUALITY LEGISLATION

BEFORE THE

SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

SUBCOMMITTEE ON

SUPERFUND, OCEAN AND WATER PROTECTION

MAY 18, 1989

I. Introduction

On behalf of the more than 800,000 members of the NATIONAL ASSOCIATION OF REALTORS® (NAR) I would like to thank the Chairman and members of the Subcommittee on Superfund, Ocean, and Water Protection, for the opportunity to present our views on S. 657, establishing an expanded indoor air quality program within the U.S. Environmental Protection Agency (U.S. EPA). The NATIONAL ASSOCIATION OF REALTORS® (NAR) is the world's largest trade association and represents almost every aspect of the real estate industry. Among the affiliated groups are the Society of Industrial and Office REALTORS®, the Institute of Real Estate Management, and the American Institute of Real Estate Appraisers.

Everyday we are given more information through newspaper articles and television reports on pollutants in our environment and their physical and emotional impact on our lives. Scientists are now discovering that pollution in our indoor living and working environments may also have an impact on our ability to lead normal, healthy and productive lives. For years we have heard

about contaminants such as asbestos and radon and their long term effect on our health. More recently, we have begun to learn about "sick building syndrome" and its wide range of temporary health-related side effects such as headaches, sinus problems and nausea, often referred to as "building related illness".

The NATIONAL ASSOCIATION OF REALTORS® strongly believes that every individual should have the opportunity to live in safe and decent housing. The NATIONAL ASSOCIATION OF REALTORS® also believes that all Americans are entitled to enjoy an indoor living environment where risks to health and welfare from pollution are minimized. The NATIONAL ASSOCIATION OF REALTORS® supports increased efforts by both the private and public sectors to characterize and evaluate the extent of indoor air quality problems and to encourage the development of meaningful and affordable monitoring and mitigation strategies.

The NATIONAL ASSOCIATION OF REALTORS® continues to play an active and positive role in the indoor air quality debate through our participation in numerous work groups, seminars, and conferences on indoor air quality issues such as asbestos and radon. Although the real estate industry works together closely in examining these issues, it must be remembered that the individual trade associations represent different interests and therefore, have developed distinctive policies on indoor air quality.

One example of the NATIONAL ASSOCIATION OF REALTORS® effort to inform and educate REALTORS® about indoor air quality issues was our production and

distribution of thousands of radon information kits to REALTORS® and the public. (Incidentally, these kits were available long before the publication of the U.S. Environmental Protection Agency's radon booklets). Twice annually NAR distributes the REALTORS® Hazardous Substances Task Force manual to educate REALTORS® on a variety of hazards they may encounter in the field, including indoor radon and asbestos. The NATIONAL ASSOCIATION OF REALTORS® continues to meet with officials of the federal government as well as members of the scientific community to discuss various technical and public awareness problems relating to indoor air quality.

II. Legislation

The NATIONAL ASSOCIATION OF REALTORS® supports the approach taken in S. 657 which comprehensively addresses the indoor air quality issue rather than reviewing and legislating on each pollutant individually. The many benefits to this approach include the capacity to examine and ultimately treat categories of indoor air contaminants that, alone may pose little or no threat to the health of building occupants. The legislation authorizes much needed funds to states for the development of programs to address indoor air contamination.

III. Indoor Air Quality Research

S. 657 lists many areas of research that the U.S. EPA is responsible for implementing. However, such a lengthy list of research priorities can diminish the ability of the U.S. EPA to prioritize certain key elements of

indoor air quality research that requires immediate attention. For example, according to the National Institute of Occupational Safety and Health (NIOSH), over 50% of current indoor air problems can be aided through better understanding and operation of heating, ventilation and air conditioning systems. While improved ventilation is not a panacea for all indoor air problems, it should be clearly identified as a top priority for U.S. EPA research and development. While all of the research needs identified in Section 5 are important, prompt attention by the U.S. EPA on ventilation strategies could have an immediate impact on the quality of air in thousands of buildings. People could be enjoying improved air quality while the U.S. EPA continues to work on the other research priorities outlined in Section 5.

The legislation's research objectives should clearly address the contribution of building materials and consumer products to indoor air quality degradation. With so many research objectives for the U.S. EPA to fulfill, we believe that careful examination of these two sources of possible indoor contamination and of subsequent control strategies could result in a more immediate response to the public health problem than some of the other research needs. We must recognize the value of preventative measures in reducing the need for more complex and costly after the fact mitigation efforts. Prevention of contamination at the source needs priority attention.

A third research objective that should be a priority is the identification of the optimal means for dissemination of informational documents on indoor air contamination. S. 657 utilizes technology and management practice assessment bulletins in Section 5 and health advisories in

Section 6 as the primary means of information dissemination. However, it is not clear that information dissemination is best achieved by these technology bulletins and health advisories. Information on indoor pollutants and their health risks must be accompanied by information on action levels at which specified mitigation techniques should be used. Those action levels must be realistically achievable and should not require the indoor air to have lower pollution levels than the outdoor air.

IV. Information Dissemination

We urge the Congress to make a careful examination of the current U.S. Environmental Protection Agency, Department of Energy, and Consumer Product Safety Commission programs for technology transfer and risk communication to the public. These agencies have a great deal of experience in these two areas and their existing programs can be evaluated to determine what additional means of communicating indoor air quality information will be most effective to the building owner, the architect or engineer, maintenance personnel, and building occupants.

The U.S. EPA's radon program has been extremely successful in heightening public awareness of radon through the publication of the Citizen's Guide to Radon and Radon Reduction Methods. These documents, as well as the U.S. EPA's state surveys, have had a positive impact on Americans testing their homes. We feel the lessons learned from the radon program are valuable and can be applied to other indoor air quality programs. Under S. 657, technology bulletins and health advisories are developed and distributed in a

somewhat awkward manner. The legislation should be modified to produce documents for public dissemination that are more timely, that discuss health risks at elevated levels of indoor pollutants, and simultaneously discuss state-of-the-art control and monitoring methodologies and costs.

Under S. 657, a listing procedure is developed for every contaminant found in the indoor environment to help the U.S. EPA develop its health advisories. Again, with limited resources at the Agency, there are more useful ways for the U.S. EPA to expend its time and funds. (Many textbooks and professional journals can provide a list of indoor air contaminants.) Additionally, the listing process itself detracts from the major thrust of the bill that groups of pollutants, rather than individual contaminants, should be studied and controlled. What is needed is a mechanism to help the U.S. EPA focus on those pollutants that present real and significant risks to the public.

Likewise, information dissemination through the use of "health advisories" under the legislation can thwart the ability of the Administrator to concentrate on the more significant indoor contaminants. Under this legislation, health advisories (at least six in 18 months) are to be issued on individual contaminants regardless of their frequency of occurrence or their significance to health. The advisories must list at what level a zero risk can be obtained, whether or not it is technologically feasible. Finally, the fact that health advisories are pollutant specific again seems to contrast with the bill's intent to focus on research and mitigation strategies relating to groups of contaminants. We urge that Congress review and re-evaluate the

mechanisms it wants the U.S. EPA to utilize for public information dissemination.

V. Office of Indoor Air Quality

Section 10 of S. 657 would be strengthened if the Office of Indoor Air Quality was subject to review of the Office of Toxic Substances (OTS), as well as the Office of Air and Radiation. OTS has a history of dealing with a variety of toxic chemicals such as formaldehyde and pesticides. Much of the preventative nature of indoor air contamination will require an understanding of the chemistry and the manufacturing of consumer products and building materials. The Office of Toxic Substances can provide this kind of expertise and should have a major involvement in developing mitigation strategies.

VI. NIOSH Building Assessment

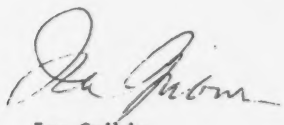
S. 657 includes the codification of the current National Institute of Occupational Safety and Health (NIOSH) regulations regarding building assessments. The function and value of this program needs to be explored by this Committee.

Additional hearings on indoor air quality in the 101st Congress should include an examination of the NIOSH program. NIOSH representatives, union representatives, and building owners who have been involved with the NIOSH program could provide the Committee with the information it needs to determine the appropriate role of NIOSH in the U.S. EPA's indoor air efforts.

VI. Conclusion

We are pleased and encouraged that Congress is addressing the serious issue of indoor air quality and its effect on our health and welfare. The NATIONAL ASSOCIATION OF REALTORS® will continue to take a lead role on this issue and remains dedicated to the further education of our membership as well as the general public to the hazards that are present in our indoor environment. We look forward to working with this Subcommittee during the 101st Congress in developing comprehensive indoor air quality legislation that provides necessary scientific research on the health risks posed by contaminants, and encourages government and the private sector to develop workable testing and mitigation practices.

Respectfully submitted,



Ira Gribin

President

II

101ST CONGRESS
1ST SESSION

S. 657

To authorize a national program to reduce the threat to human health posed by exposure to contaminants in the air indoors.

IN THE SENATE OF THE UNITED STATES

MARCH 17 (legislative day, JANUARY 3), 1989

Mr. MITCHELL (for himself, Mr. CHAFEE, Mr. LAUTENBERG, Mr. DURENBERGER, Mr. BAUCUS, Mr. GRAHAM, Mr. MOYNIHAN, Mr. COHEN, Mr. PRESSLER, Mr. WIRTH, Mr. GORE, Mr. CONRAD, Mr. SARBANES, Mr. ADAMS, Mr. REID, Mr. LIEBERMAN, Ms. MIKULSKI, Mr. HUMPHREY, and Mr. BRADLEY) introduced the following bill; which was read twice and referred to the Committee on Environment and Public Works

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A BILL

To authorize a national program to reduce the threat to human health posed by exposure to contaminants in the air indoors.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE AND TABLE OF CONTENTS

SECTION 1. TITLE.—(a) This Act, together with the following table of contents, may be cited as the "Indoor Air Quality Act of 1989".

(b) TABLE OF CONTENTS.—

Sec. 1. Short title and table of contents.
Sec. 2. Findings.
Sec. 3. Purpose.

Sec. 4. Definitions.
Sec. 5. Indoor air quality research.
Sec. 6. Indoor air contaminant health advisories.
Sec. 7. National indoor air quality response plans.
Sec. 8. Federal building response plan and demonstration program.
Sec. 9. State indoor air quality programs.
Sec. 10. Office of Indoor Air Quality.
Sec. 11. Council on Indoor Air Quality.
Sec. 12. Indoor air quality information clearinghouse.
Sec. 13. Building assessment demonstration.
Sec. 14. State and Federal authority.
Sec. 15. Authorizations.

FINDINGS

SEC. 2. The Congress finds that—

(1) Americans spend up to 90 per centum of a day indoors and, as a result, have a significant potential for exposure to contaminants in the air indoors;

(2) exposure to indoor air contamination occurs in workplaces, schools, public buildings, residences, and transportation vehicles;

(3) recent scientific studies indicate that pollutants in the indoor air include radon, asbestos, volatile organic chemicals (including, formaldehyde and benzene), combustion byproducts (including, carbon monoxide and nitrogen oxides), metals and gases (including, lead, chlorine, and ozone), respirable particles, environmental tobacco smoke, biological contaminants, microorganisms, and other contaminants;

(4) a number of contaminants found in both ambient air and indoor air may occur at higher concentrations in indoor air than in outdoor air;

(5) indoor air pollutants pose serious threats to public health (including cancer, respiratory illness, multiple chemical sensitivities, skin and eye irritation, and related effects);

(6) the National Academy of Sciences estimates that up to 15 per centum of the United States population may have heightened sensitivity to chemicals and related substances found in the air indoors

(7) radon is among the most harmful indoor air pollutants and is estimated to cause between five thousand and twenty thousand lung cancer deaths each year;

(8) other selected indoor air pollutants are estimated to cause between three thousand five hundred and six thousand five hundred additional cancer cases per year;

(9) indoor air contamination is estimated to cause significant increases in medical costs and declines in work productivity;

(10) as many as 20 per centum of office workers may be exposed to environmental conditions manifested as "sick building syndrome";

(11) sources of indoor air pollution include conventional ambient air pollution sources, building materials, consumer and commercial products, combustion

appliances, indoor application of pesticides and other sources;

(12) there is not an adequate effort by Federal agencies to conduct research on the seriousness and extent of indoor air contamination, to identify the health effects of indoor air contamination, and to develop control technologies, education programs, and other methods of reducing human exposure to such contamination;

(13) there is not an adequate effort by Federal agencies to develop response plans to reduce human exposure to indoor air contaminants and there is a need for improved coordination of the activities of these agencies;

(14) there is not an adequate effort by Federal agencies to develop methods, techniques, and protocols for assessment of indoor air contamination in non-residential, non-industrial buildings and to provide guidance on measures to respond to contamination; and

(15) State governments can make significant contributions to the effective reduction of human exposure to indoor air contaminants and the Federal Government should assist States in development of programs to reduce exposures to these contaminants.

PURPOSE

SEC. 3. The purposes of this Act are to—

(1) establish at the Environmental Protection Agency and at other agencies of the United States a comprehensive and coordinated program of research and development concerning the seriousness and extent of indoor air contamination, the human health effects of indoor air contaminants, and the technological and other methods of reducing human exposure to such contaminants;

(2) establish a process whereby the existing authorities of Federal statutes will be directed and focused to assure the full and effective application of these authorities to reduce human exposure to indoor air contaminants where appropriate;

(3) provide support to State governments to demonstrate and develop air quality management strategies, assessments, and response programs; and

(4) to authorize activities to assure the general coordination of indoor air quality-related activity, to provide for reports on indoor air quality to Congress, to provide for assessments of indoor air contamination in specific buildings by the National Institute for Occupational Safety and Health, to assure that data and information on indoor air quality issues is available to interested parties, to provide training, education, informa-

tion and technical assistance to the public and private sector, and for other purposes.

DEFINITIONS

SEC. 4. For the purposes of this Act, the term—

(1) "Agency" means the United States Environmental Protection Agency;

(2) "indoor" refers to the enclosed portions of buildings including non-industrial workplaces, public buildings, Federal buildings, schools, commercial buildings, residences, and the occupied portions of vehicles;

(3) "indoor air contaminant" means any solid, liquid, semisolid, dissolved solid, biological organism, aerosol, or gaseous material, including combinations or mixtures of substances in indoor air which may reasonably be anticipated to have an adverse effect on human health;

(4) "Federal agency" or "agency of the United States" means any department, agency or other instrumentality of the Federal Government, including any independent agency or establishment of the Federal Government or government corporation;

(5) "Federal building" means any building which is owned or leased by the Federal Government and managed by the General Services Administration;

(6) "Administrator" means to the Administrator of the Environmental Protection Agency;

(7) "Director" means the Director of the National Institute of Occupational Safety and Health;

(8) "local education agency" means any educational agency as defined in section 198 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 3381); and

(9) "local air pollution control agency" means any city, county, or other local government authority charged with the responsibility for implementing programs or enforcing ordinances or laws relating to the prevention and control of air pollution including indoor air pollution.

INDOOR AIR QUALITY RESEARCH

SEC. 5. (a) AUTHORITY.—(1) The Administrator shall, in cooperation with appropriate Federal agencies, establish a national research, development, and demonstration program to assure the quality of air indoors and as part of such program shall promote the coordination and acceleration of research, investigations, experiments, demonstrations, surveys, and studies relating to the causes, sources, effects, extent, prevention, detection, and correction of contamination of indoor air.

(2) In carrying out the provisions of this section, the Administrator is authorized to—

(A) collect and make available to the public through publications and other appropriate means, the

results of research, development and demonstration activities conducted pursuant to this section;

(B) conduct research, development and demonstration activities and cooperate with other Federal agencies, with State and local government entities, interstate and regional agencies, other public agencies and authorities, nonprofit institutions and organizations and other persons in the preparation and conduct of such research, development and demonstration activities;

(C) make grants to the States or to local government entities, to other public agencies and authorities, to nonprofit institutions and organizations, and to other persons;

(D) enter into contracts or cooperative agreements with public agencies and authorities, nonprofit institutions and organizations, and other persons;

(E) conduct studies, including epidemiological studies, of the effects of indoor air contaminants or potential contaminants on mortality and morbidity and clinical and laboratory studies on the immunologic, biochemical, physiological, and toxicological effects including the carcinogenic, teratogenic, mutagenic, cardiovascular, and neurotoxic effects of indoor air contaminants or potential contaminants;

(F) develop and disseminate informational documents on indoor air contaminants describing the nature and characteristics of such contaminants in various concentrations;

(G) develop effective and practical processes, methods, and techniques for the prevention, detection, and correction of indoor air contamination and work with the private sector to encourage the development of innovative techniques to improve indoor air quality;

(H) construct such facilities and staff and equip them as may be necessary to carry out the provisions of this section;

(I) call conferences concerning the potential or actual contamination of indoor air giving opportunity for interested persons to be heard and present papers at such conferences;

(J) utilize, on a reimbursable basis, facilities and personnel of existing Federal scientific laboratories and research centers; and

(K) acquire secret processes, technical data, inventions, patent applications, patents, licenses, and an interest in lands, plants, equipment and facilities and other property rights, by purchase, license, lease, or donation.

(b) PROGRAM REQUIREMENTS.—The Administrator shall conduct or assist research, investigations, studies, surveys, or demonstrations with respect to, but not limited to, the following—

(1) the effects on human health of contaminants or combinations of contaminants at various levels whether natural or anthropogenic, that are found or are likely to be found in indoor air;

(2) the exposure of persons to contaminants that are found in indoor air (including exposure to such substances from sources other than indoor air contamination including drinking water, diet, or other exposures);

(3) the identification of populations at increased risk of illness from exposure to indoor air contaminants and assessment of the extent and characteristics of such exposure;

(4) the exposure of persons to contaminants in different building classes or types, and in vehicles, and assessment of the association of particular contaminants and particular building classes or types and vehicles;

(5) identification of building classes or types and design features or characteristics which increase the likelihood of exposure to indoor air contaminants;

(6) assessment of the exposure of workers in non-industrial settings to indoor air contaminants, including assessment of resulting health effects, declines in productivity, such time use, increased use of employer paid health insurance, and workers compensation claims, and the costs of such declines in productivity, sick time use, and benefits claims;

(7) identification of the sources of indoor air contaminants including association of contaminants with outdoor sources, building or vehicle design, classes or types of products, building management practices, equipment operation practices, building materials, and related factors;

(8) assessment of relationships between contaminant concentration levels in ambient air and the contaminant concentration levels in the indoor air;

(9) development of methods and techniques for characterizing and modeling indoor air movement and flow within buildings or vehicles, including the transport and dispersion of contaminants in the indoor air;

(10) assessment of the fate, including degradation and transformation, of particular contaminants in indoor air;

(11) development of methods and techniques to characterize the association of contaminants, the levels

of contaminants, and the potential for contamination of new construction with climate, building location, seasonal change, soil and geologic formations, and related factors;

(12) assessment of indoor air quality in facilities of local education agencies and development of measures and techniques for control of indoor air contamination in such buildings;

(13) development of methods, techniques and instruments for sampling indoor air to determine the presence and level of contaminants including sample collection and the storage of samples before analysis and development of methods to improve the efficiency and reduce the cost of analysis;

(14) development of air quality sampling methods and instruments which are inexpensive and easy to use and may be used by the general public;

(15) development of control technologies or other measures to prevent the entrance of contaminants into buildings or vehicles (for example, air intake protection, sealing, and related measures) and to reduce the concentrations of contaminants indoors (for example, control of emissions from internal sources of contamination, improved air exchange and ventilation, and related measures);

(16) development of materials and products which may be used as alternatives to materials or products which are now in use and which contribute to indoor air contamination;

(17) development of building or vehicle management practices and related activities which will contribute to the reduction of indoor air contaminants;

(18) development of equipment and processes for removal of contaminants from the indoor air; and

(19) research, to be carried out in conjunction with the Secretary of Housing and Urban Development, for the purpose of developing—

(A) methods for assessing the potential for radon contamination of new construction, including (but not limited to) consideration of the moisture content of soil, porosity of soil, and radon content of soil; and

(B) design measures to avoid indoor air pollution.

(c) TECHNOLOGY DEMONSTRATION PROGRAM.—(1) The Administrator may enter into cooperative agreements or contracts, or provide financial assistance in the form of grants, to public agencies and authorities, nonprofit institutions and organizations, employee advocate organizations, local educational institutions, or other persons, to demon-

strate practices, methods, technologies, or processes which may be effective in controlling sources or potential sources of indoor air contamination, preventing the occurrence of indoor air contamination, and reducing exposures to indoor air contamination.

(2) The Administrator may assist demonstration activities under paragraph (1) of this subsection only if—

(A) such demonstration activity will serve to demonstrate a new or significantly improved practice, method, technology or process or the feasibility and cost effectiveness of an existing, but unproven, practice, method, technology, or process and will not duplicate other Federal, State, local, or commercial efforts to demonstrate such practice, method, technology, or process;

(B) such demonstration activity meets the requirements of this section and serves the purposes of this Act;

(C) the demonstration of such practice, technology, or process will comply with all other laws and regulations for the protection of human health, welfare, and the environment; and

(D) in the case of a contract or cooperative agreement, such practice, method, technology, or process would not be adequately demonstrated by State, local,

or private persons or in the case of an application for financial assistance by a grant, such practice, method, technology, or process is not likely to receive adequate financial assistance from other sources.

(3) The demonstration program established by this subsection shall include solicitations for demonstration projects, selection of suitable demonstration projects from among those proposed, supervision of such demonstration projects, evaluation of the results of demonstration projects, and dissemination of information on the effectiveness and feasibility of the practices, methods, technologies and processes which are proven to be effective.

(4) Within one hundred and eighty days after the date of enactment of this Act, and no less often than every twelve months thereafter, the Administrator shall publish a solicitation for proposals to demonstrate, prototype or at full-scale, practices, methods, technologies, and processes which are (or may be) effective in controlling sources or potential sources of indoor air contaminants. The solicitation notice shall prescribe the information to be included in the proposal, including technical and economic information derived from the applicant's own research and development efforts, and other information sufficient to permit the Administrator to assess the potential effectiveness and feasibility of the practice, method, technology, or process proposed to be demonstrated.

(5) Any person and any public or private nonprofit entity may submit an application to the Administrator in response to the solicitations required by paragraph (4) of this section. The application shall contain a proposed demonstration plan setting forth how and when the project is to be carried out and such other information as the Administrator may require.

(6) In selecting practices, methods, technologies or processes to be demonstrated, the Administrator shall fully review the applications submitted and shall evaluate each project according to the following criteria—

(A) the potential for the proposed practice, method, technology, or process to effectively control sources or potential sources of contaminants which present risks to human health;

(B) the consistency of the proposal with the recommendations provided pursuant to paragraph (8) of section 7(d);

(C) the capability of the person or persons proposing the project to successfully complete the demonstration as described in the application;

(D) the likelihood that the demonstrated practice, method, technique, or process could be applied in other locations and circumstances to control sources or potential sources of contaminants, including con-

siderations of cost, effectiveness, and technological feasibility;

(E) the extent of financial support from other persons to accomplish the demonstration as described in the application; and

(F) the capability of the person or persons proposing the project to disseminate the results of the demonstration or otherwise make the benefits of the practice, method, or technology widely available to the public in a timely manner.

(7) The Administrator shall select or refuse to select a project for demonstration under this subsection in an expeditious manner. In the case of a refusal to select a project, the Administrator shall notify the applicant of the reasons for the refusal.

(8) Each demonstration project under this section shall be performed by the applicant, or by a person satisfactory to the applicant, under the supervision of the Administrator. The Administrator shall enter into a written agreement with each applicant granting the Administrator the responsibility and authority for testing procedures, quality control, monitoring, and other measurements necessary to determine and evaluate the results of the demonstration project.

(9) The Administrator shall enter into arrangements, wherever practicable and desirable, to provide for monitoring

testing procedures, quality control, and such other measurements necessary to evaluate the results of demonstration projects or facilities intended to control sources or potential sources of contaminants.

(10) Each demonstration project under this section shall be completed within such time as is established in the demonstration plan. The Administrator may extend any deadline established under this subsection by mutual agreement with the applicant concerned.

(11) Total Federal funds for any demonstration project under this section shall not exceed 75 per centum of the total cost of such project. In cases where the Administrator determines that research under this section is of a basic nature which would not otherwise be undertaken, or the applicant is a local educational agency, the Administrator may approve grants under this section with a matching requirement other than that specified in this subsection, including full Federal funding.

(12) The Administrator shall, from time to time, publish general reports describing the findings of demonstration projects conducted pursuant to this section. Such reports shall be provided to the Indoor Air Quality Information Clearinghouse provided for in section 12 of this Act.

(d) TECHNOLOGY AND MANAGEMENT PRACTICE ASSESSMENT BULLETINS.—(1) The Administrator shall publish

bulletins providing an assessment of technologies and management practices for the control and measurement of contaminants in the air indoors.

(2) Bulletins published pursuant to this subsection shall, at a minimum—

(A) describe the control or measurement technology or practice;

(B) describe the effectiveness of the technology or practice in control measurement of indoor air contaminants;

(C) assess the feasibility of application of the technology or practice in buildings of different types, sizes, ages, and designs; and

(D) assess the cost of application of the technology or practice in buildings of different types, sizes, ages, and designs, including capital and operational costs.

(3) The Administrator shall establish and utilize a standard format for presentation of the technology and management practice assessment bulletins. The format shall be designed to facilitate assessment of technologies or practices by interested parties, including homeowners and building owners and managers.

(4) The Administrator shall provide that bulletins published pursuant to this subsection shall be published on a

schedule consistent with the publication of health advisories pursuant to subsection 6(b) of this Act to the extent practicable.

(5) In development of bulletins pursuant to this subsection, the Administrator shall provide for public review and shall consider public comment prior to publication of bulletins.

(6) Bulletins published pursuant to this subsection shall be provided to the Indoor Air Quality Information Clearinghouse provided for in section 12 of this Act and, to the extent practicable, shall be made available to architecture, design, and engineering firms and building owners and managers and to organizations representing such parties.

(e) CHILD CARE FACILITIES.—(1) The Administrator shall develop protocols for the measurement of radon gas in child care facilities within six months after the date of enactment of this Act.

(2) The Administrator shall make available to the appropriate agency of each State, to organizations representing child care facilities, and to the public, information concerning appropriate techniques to measure radon levels in child care facilities, areas and physical characteristics of buildings housing child care facilities with high radon risks and mitigation measures for reducing radon levels.

(3) The Administrator is authorized to make available to the appropriate agencies of the State, as designated by the Governor of such State, canisters or other suitable devices for use by such agencies in conducting tests for radon within child care facilities in the State. The Administrator is authorized to make available to such agencies the use of laboratories of the Environmental Protection Agency, or to recommended laboratories, to evaluate any such canisters or devices for the presence of radon levels.

(4) The Administrator is authorized to undertake diagnostic and remedial efforts to reduce the levels of radon in nonresidential child care facilities. Such diagnostic and remedial efforts shall be carried out with a view to developing technology and expertise for the purpose of making such technology and expertise available to any child care facility and the several States.

(5) The Administrator shall submit a report to the Congress on his actions to implement this subsection within twelve months after the date of enactment of this Act and annually thereafter.

(f) EXPOSURE ASSESSMENT.—(1) The Administrator shall conduct a study of the appropriateness, feasibility, and implications of considering human exposure to a pollutant in indoor air in development of ambient air quality standards under section 109 and national emissions standards for haz-

ardous air pollutants under section 112 of the Clean Air Act (42 U.S.C. 7409, 7412).

(2) The Administrator shall establish an advisory group, made up of representatives of the scientific community, industrial and commercial entities and consumer and environmental groups to provide guidance and direction in the development of the study.

(3) The Administrator shall report to the Congress the results of the study not later than three years after the date of enactment of this Act including any recommendations for actions to implement the findings of the study.

(g) SCHOOL ASSESSMENTS.—(1) The Administrator shall conduct a national assessment of the seriousness and extent of indoor air contamination in buildings owned by local educational agencies.

(2) The Administrator shall establish an advisory group made up of representatives of school administrators, teachers, parents and service employees and other interested parties to provide guidance and direction in the development of the national assessment.

(3) The Administrator shall provide a report to Congress of the results of the national assessment not later than two years after the date of enactment of this Act. The report required by this paragraph shall provide such recommendations for activities or programs to reduce and avoid indoor air

contamination in buildings owned by local educational agencies as the Administrator determines to be appropriate.

(h) CLARIFICATION OF AUTHORITY.—Title IV of the Superfund Amendments and Reauthorization Act of 1986 (42 U.S.C. 7401 note) is repealed.

INDOOR AIR CONTAMINANT HEALTH ADVISORIES

SEC. 6. (a) LIST OF CONTAMINANTS.—(1) Within two hundred and forty days after the date of enactment of this Act, the Administrator shall prepare and publish in the Federal Register a list of the contaminants which are known to occur (or which are expected to occur) in indoor air. The list may include combinations or mixtures of contaminants and may refer to such combinations or mixtures by a common name.

(2) The Administrator shall from time to time and as necessary to carry out the provisions of this Act, but not less often than biennially, review and revise such list adding other contaminants pursuant to the requirements of this Act.

(3) The list provided for in paragraph (1) of this subsection shall include, at a minimum—

(A) any air pollutant listed pursuant to section 108(a)(1) of the Clean Air Act (42 U.S.C. 7408(a)(D);

(B) any hazardous air pollutant listed pursuant to section 112(b)(1)(A) of the Clean Air Act (42 U.S.C. 7412(b)(1)(A)); and

(C) any other contaminants which are known to occur (or which are expected to occur) in indoor air.

(4) In development of the list provided for in paragraph (1) of this subsection or in revision of such list pursuant to paragraph (2), the Administrator shall provide for public review and shall consider public comment prior to issuance of a final list.

(5) The listing of contaminants under this subsection is not an agency rulemaking. In considering objections raised in any judicial or related action, the Administrator's decision to list a particular contaminant shall be upheld unless the objecting party can demonstrate that the decision was arbitrary or capricious or otherwise not in accordance with the law. The list of contaminants prepared in accordance with this subsection shall not be construed to indicate that those contaminants not listed are safe for human exposure or without adverse health effect.

(6) Upon application of the Governor of a State showing that a contaminant or potential contaminant in the indoor air which is not listed pursuant to paragraph (1) of this subsection may reasonably be anticipated to have an adverse effect on human health as a result of its presence in the indoor air, the Administrator shall, within ninety days, revise the list established by paragraph (1) of this subsection to include such

contaminant or publish in the Federal Register the reasons for not making such a revision.

(b) CONTAMINANT HEALTH ADVISORIES.—(1) The Administrator shall, in consultation with the advisory panel, provided for in subsection (c) of this section, and after providing for public review and comment, pursuant to paragraph (7), publish advisory materials addressing the adverse human health effects of individual contaminants listed pursuant to subsection (a) of this section. Such advisory materials shall, at a minimum, describe—

(A) the physical, chemical, biological, and radiological properties of the contaminant;

(B) the adverse human health effects of the contaminant in various indoor environments and in various concentrations;

(C) an analysis of the risk posed by the contaminant to human health at various concentrations including risk to subpopulations which may be especially sensitive to exposure to the contaminant;

(D) the concentration of the contaminant at which there is no known or anticipated human health effect, with an adequate margin of safety;

(E) the extent to which the contaminant, or a mixture of contaminants, is associated with a particular substance or material and emissions rates which are

expected to result in varying levels of contaminant concentration in indoor air; and

(F) any indoor air contaminant standards or related action levels which are in effect under any authority of a Federal statute or regulation, the authority of State statutes or regulations, the authority of any local government, or the authority of another country, including standards or action levels suggested by appropriate international organizations.

(2) Health advisories published pursuant to this section shall in no way limit or restrict the application of requirements or standards established under any other Federal statute.

(3) The Administrator may publish health advisories for contaminants for which a standard has been established pursuant to section 109 or 112 of the Clean Air Act (42 U.S.C. 7409, 7412).

(4) The Administrator shall establish and utilize a standard format of presentation of indoor air contaminant health advisories. The format shall be designed to facilitate public understanding of the range of risks of exposure to indoor air contaminants and shall include a summary of the research and information concerning the contaminant which is understandable to public health professionals and to those who lack training in toxicology.

(5) The Administrator shall publish health advisories for individual indoor air contaminants listed pursuant to subsection (a) of this section as expeditiously as possible. At a minimum, the Administrator shall publish not less than six advisories within eighteen months of the date of enactment of this Act and shall publish an additional six advisories within thirty six months of the date of enactment of this Act.

(6) Health advisories shall be based on the most current available scientific and related findings or information and shall be reviewed, revised, and republished to reflect new scientific and related findings or information on a periodic basis but not less frequently than every five years.

(7) In development and revision of health advisories pursuant to this subsection, the Administrator shall provide for public review and comment, including provision of notice in the Federal Register of the intent to publish a health advisory not less than ninety days prior to publication.

(c) ADVISORY PANEL.—The Indoor Air Panel of the EPA Science Advisory Board shall advise the Administrator with respect to the implementation of this section including, but not limited to, the listing of contaminants, the contaminants for which advisories should be published, the order in which advisories should be published, the content, quality, and format of advisory documents, and the revision of such documents. The Administrator shall provide that a represent-

ative of the Agency for Toxic Substances and Disease Registry, and the National Institute for Environmental Health Sciences shall participate in the work of the Board as ex officio members.

NATIONAL INDOOR AIR QUALITY RESPONSE PLAN

SEC. 7. (a) AUTHORITY.—(1) The Administrator shall, in consultation with appropriate Federal agencies, develop and publish a national indoor air quality response plan.

(2) The response plan shall provide for implementation of a range of response actions which will result in the reduction of human exposure to indoor air contaminations listed pursuant to section 6(a) of this Act and attainment, to the fullest extent practicable, of indoor air contaminant concentration levels at which there is no known or anticipated human health effect, with an adequate margin of safety.

(b) EXISTING AUTHORITY.—The Administrator shall include in the plans provided for in subsection (a) of this section a description of specific response actions to be implemented based on existing statutory authorities provided in—

(1) the Clean Air Act (42 U.S.C. 7401 et seq.);

(2) the Toxic Substances Control Act (15 U.S.C. 201 et seq.);

(3) the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136 et seq.);

(4) the Safe Drinking Water Act (42 U.S.C. 300 et seq.);

(5) the authorities of the Consumer Product Safety Commission;

(6) the authorities of the Occupational Safety and Health Administration; and

(7) other regulatory and related authorities provided under any other Federal statute.

(c) SUPPORTING ACTIONS.—The Administrator shall include in the plans provided for in subsection (a) of this section a description of specific supporting actions including, but not limited to—

(1) programs to disseminate technical information to public health, design, and construction professionals concerning the risks of exposure to indoor air contaminants and methods and programs for reducing exposures to such contaminants;

(2) development of guidance documents addressing individual contaminants, groups of contaminants, sources of contaminants, or types of buildings or structures and providing information on measures to reduce exposure to contaminants including—

(A) the estimated cost of such measures;

(B) the technologic feasibility of such measures; and

(C) the effectiveness and efficiency of such measures.

(3) education programs for the general public concerning the health threats posed by indoor air contaminants and appropriate individual response actions;

(4) technical assistance to States and local air pollution control organizations and related groups concerning the risks of exposure to indoor air contaminants and methods and programs for reducing exposures to such contaminants; and

(5) development of model building codes, including ventilation rates, for various types of buildings designed to reduce levels of indoor air contaminants.

(d) CONTENTS OF PLAN.—In describing specific actions to be taken under subsections (b) and (c) of this section, the Administrator shall—

(1) identify the contaminant or contaminants to be addressed by a particular action;

(2) identify the statutory basis for the action;

(3) identify the schedule and process for implementation of the action;

(4) identify contaminants, or circumstances of contamination, for which immediate action to protect public health is necessary and appropriate and describe the actions needed and the schedule for action;

(5) identify the Federal agency which will implement the action;

(6) identify the financial resources needed to implement the specific action and the source of these resources;

(7) identify contaminants, or circumstances of contamination, where existing regulatory or statutory authority is not adequate to address an identified contaminant or circumstance of contamination and recommend legislation to provide needed authority; and

(8) identify contaminants, or circumstances of contamination, where continued reduction of contamination requires development of technology or technologic mechanisms, and identify the Federal agency responsible for such development, the schedule for such development effort, and an estimate of the cost of the development effort.

(e) SCHEDULE.—The response plan provided for in subsection (a) shall be submitted to Congress within twenty-four months of enactment of this Act and biennially thereafter.

(f) REVIEW.—(1) The Administrator shall provide for public review and comment on the response plan provided for in this section, including provision of notice in the Federal Register for public review and comment not less than three months prior to submission to the Congress. The Administrator shall include in the response plan a summary of public comments.

(2) The Administrator shall provide for the review and comment on the response plan by the Council on Indoor Air Quality provided for under section 11 of this Act. The Administrator shall include in the response plan a letter and any supporting materials providing the comments of the Council on Indoor Air Quality.

FEDERAL BUILDING RESPONSE PLAN AND DEMONSTRATION PROGRAM

SEC. 8. (a) AUTHORITY.—The Administrator and the Administrator of the General Services Administration shall develop and implement a program to respond to and reduce indoor air contamination in Federal buildings and to demonstrate methods of reducing indoor air contamination in new Federal buildings.

(b) FEDERAL BUILDING RESPONSE PLAN.—(1) The Administrator of the General Services Administration, in consultation with the Administrator, shall prepare a response plan addressing indoor air quality in Federal buildings and shall provide for the implementation of such plan. The plan shall, to the fullest extent practicable, be developed in conjunction with the response plan pursuant to section 7 of this Act.

(2) The response plan shall provide for implementation of a range of response actions which will result in the reduction of human exposure to indoor air contaminants listed pursuant to section 6(a) of this Act and attainment, to the fullest

extent practicable, of indoor air contaminant concentration levels at which there is no known or anticipated human health effect, with an adequate margin of safety.

(3) Federal building response plans provided for in paragraph (1) of this subsection shall include—

(A) a list of all Federal buildings;

(B) a description and schedule of general response actions including general management practices, product purchase guidelines, air quality problem identification practices and methods, personnel training programs, and other actions to be implemented to reduce exposures to indoor air contaminants in those buildings listed in paragraph (A);

(C) a list of individual Federal buildings listed in paragraph (A) for which there is sufficient evidence of indoor air contamination or related employee health effects to warrant assessment of the building pursuant to section 13 of this Act and a schedule for development and submittal of building assessment proposals pursuant to subsection 13(d) of this Act;

(D) a description and schedule of specific response actions to be implemented in each specific building identified in paragraph (C) and assessed pursuant to section 13 of this Act;

(E) an identification of the Federal agency responsible for funding and implementation of each response action identified in paragraphs (B) and (D); and

(F) an identification of the estimated costs of each response action identified in paragraphs (B) and (D) and the source of these resources.

(4) The response plan provided for in this subsection shall address each Federal building identified in paragraph 3(A), except that specific buildings may be exempted from coverage under this subsection. Such buildings may be exempted on the grounds of—

(A) national security;

(B) anticipated demolition or termination of Federal ownership within three years; and

(C) specialized use of a building which precludes necessary actions to obtain applicable standards or concentration levels.

(5) The Administrator of the General Services Administration shall provide, by regulation, a method and format for filing of comments and complaints concerning indoor air quality in Federal buildings by workers in such buildings and by the public. The Administrator of the General Services Administration shall provide a listing of each such filing and an analysis of such filings in the plan required pursuant to this section.

(6) The plan provided for in subsection (b) shall be submitted to Congress within twenty-four months of enactment of this Act and biennially thereafter.

(7) The Administrator of the General Services Administration shall provide for public review and comment on the response plan provided for in this section, including provision of notice in the Federal Register not less than three months prior to submission to the Congress. The response plan shall include a summary of public comments. The Council on Indoor Air Quality, provided for under section 11 of this Act, shall review and comment on the plan and such comments and any supporting materials shall be included in the plan.

(c) INDOOR AIR QUALITY RESERVE.—(1) The Administrator of the General Services Administration shall reserve 0.5 per centum of any funds appropriated for construction of new Federal buildings for design and construction of measures to reduce indoor air contaminant concentrations within such buildings.

(2) Measures which may be funded with the reserve provided for in this subsection may include, but are not limited to—

(A) development and implementation of general design principles intended to avoid or prevent contamination of indoor air;

(B) design and construction of improved ventilation techniques or equipment;

(C) development and implementation of product purchasing guidelines;

(D) design and construction of contaminant detection and response systems;

(E) development of building management guidelines and practices; and

(F) training in building and systems operations for building management and maintenance personnel.

(3) Upon completion of construction of each Federal building covered by this section, the Administrator of the General Services Administration shall file with the Administrator, with the Clearinghouse established under section 12 of this Act, and with the Council established under section 11 of this Act, a report describing the uses made of the reserve provided for in this subsection. Such report shall be in sufficient detail to provide design and construction professionals with models and general plans of various indoor air contaminant reduction measures adequate to assess the appropriateness of such measures for application in other buildings.

(4) The Administrator of the General Services Administration, with the concurrence of the Administrator, may exempt a planned Federal building from the requirements of this section if he finds that such exemption is required on the

grounds of national security or that the intended use of the building is not compatible with the authority of this section.

(d) NEW EPA BUILDING.—Any new building constructed for use by the Environmental Protection Agency as headquarters shall be designed, constructed, maintained, and operated as a model to demonstrate principles and practices for protection of indoor air quality.

STATE AND LOCAL INDOOR AIR QUALITY PROGRAMS

SEC. 9. (a) MANAGEMENT AND ASSESSMENT STRATEGY DEMONSTRATION.—(1) The Governor of a State may apply to the Administrator for a grant to support demonstration of the development and implementation of a management strategy and assessment with respect to indoor air quality within such State.

(2) State indoor air quality management strategies shall—

(A) identify a lead agency and provide an institutional framework for protection of indoor air quality;

(B) identify and describe existing programs, controls or related activities concerning indoor air quality within State agencies including regulations, educational programs, assessment programs, or other activities;

(C) identify and describe existing programs, controls, or related activities concerning indoor air quality of local and other sub-State agencies and assure co-

ordination among local, State, and Federal agencies involved in indoor air quality activities in the State; and

(D) assure coordination of indoor air quality programs with ambient air quality programs and related activities.

(3) State indoor air quality assessment programs shall—

(A) identify indoor air contaminants of concern and, to the extent practicable, assess the seriousness and the extent of indoor air contamination by contaminants listed in section 6(a) of this Act;

(B) identify the classes or types of buildings or other indoor environments in which indoor air contaminants pose the most serious threat to human health;

(C) if applicable, identify geographic areas in the State where there is a reasonable likelihood of indoor air contamination as a result of the presence of contaminants in the ambient air or the existence of sources of a contaminant;

(D) identify methods and procedures for indoor air contaminant assessment and monitoring;

(E) provide for periodic assessments of indoor air quality and identification of indoor air quality changes and trends; and

(F) establish methods to provide information concerning indoor air contamination to the public and to

educate the public and interested groups, including building owners and design and engineering professionals, about indoor air contamination.

(4) As part of a management strategy and assessment pursuant to this subsection, the applicant may develop contaminant action levels, guidance, or standards and may draw on health advisories developed pursuant to section 6 of this Act.

(5) States which are selected to demonstrate the development of management and assessment strategies shall provide a management strategy and assessment pursuant to subsections (2) and (3) to the Administrator within thirty-six months of selection and shall certify to the Administrator that the strategy and assessment meet the requirements of this Act.

(6) States shall provide for public review and comment on the management strategy and assessment prior to submission of such strategy and assessment to the Administrator.

(b) RESPONSE PROGRAMS.—(1) A Governor of a State or the executive officer of a local air pollution control agency may apply to the Administrator for grant assistance to develop a response program designed to reduce human exposure to an indoor air contaminant or contaminants in the State, or in a specific class or type of building in that State, or in a specific geographic area of that State.

(2) A response program shall—

(A) address a contaminant or contaminants listed pursuant to section 6(a) of this Act;

(B) identify existing data and information concerning the contaminant or contaminants to be addressed, the class or type of building to be addressed, and the specific geographic area to be addressed;

(C) describe and schedule the specific actions to be taken to reduce human exposure to the identified contaminant or contaminants;

(D) identify the State or local agency or public organization which will implement the response actions;

(E) identify the Federal, State, and local financial resources to be used to implement the response program; and

(F) provide for the assessment of the effectiveness of the response program.

(3) As part of a response program pursuant to this subsection, an applicant may develop contaminant action levels, guidance, or standards based on health advisories developed pursuant to section 6 of this Act.

(c) GRANT MANAGEMENT.—(1) Grants under subsection (a)(1) of this subsection shall not be less than $75,000 for each fiscal year.

(2) In selecting States for demonstration and implementation of management strategies and assessments under subsection (a)(1) the Administrator shall consider—

(A) the previous experience of the State in addressing indoor air quality issues;

(B) the seriousness of the indoor air quality issues identified by the State; and

(C) the potential for demonstration of innovative management or assessment measures which may be of use to other States.

(3) In selecting States for demonstration of management strategies and assessments under subsection (a)(1), the Administrator shall focus resources to assure that sufficient funds are available to selected States to provide for the development of comprehensive and thorough management strategies and assessments in each selected State and to adequately demonstrate implementation of such strategies and assessments.

(4) Grants under subsection (b)(1) of this section shall not exceed $250,000 per fiscal year and shall be available to the State for a period of not to exceed three years.

(5) In selecting response programs developed under subsection (b) for grant assistance, the Administrator shall consider—

(A) the potential for the response program to bring about reductions in indoor air contaminant levels;

(B) the contaminants to be addressed, giving priority to contaminants for which health advisories have been developed pursuant to section 6 of this Act;

(C) the type of building to be addressed, giving priority to building types in which substantial human exposures to indoor air contaminants occur;

(D) the potential for development of innovative response measures or methods which may be of use to other States or local air pollution control agencies; and

(E) the State indoor air quality management strategy and assessment, giving priority to States with complete indoor air management strategies and assessments.

(6) The Federal share of grants under subsections (a) and (b) of this section shall not exceed 75 per centum of the costs incurred in demonstration and implementation of such activities and shall be made on the condition that the non-Federal share is provided from non-Federal funds.

(7) Funds granted pursuant to subsections (a) and (b) in a fiscal year shall remain available for obligation for the next fiscal year in which obligated and for the next following fiscal year.

(8) No grant shall be made under this section in any fiscal year to a State or local air pollution control agency which in the preceding year received a grant under this section unless the Administrator determines that such agency satisfactorily implemented such grant activities in such preceding fiscal year.

(9) States and air pollution control agencies shall provide such information in applicants for grant assistance and pertaining to grant funded activities as the Administrator requires.

OFFICE OF INDOOR AIR QUALITY

SEC. 10. (a) ESTABLISHMENT.—The Administrator shall establish an Office of Indoor Air Quality within the Office of Air and Radiation at the Environmental Protection Agency.

(b) RESPONSIBILITIES.—The Office of Indoor Air Quality shall—

(1) list indoor air contaminants and develop health advisories pursuant to section 6 of this Act;

(2) develop national indoor air quality response plans as provided for in section 7 of this Act;

(3) manage Federal grant assistance provided to air pollution control agencies under section 9 of this Act;

(4) assure the coordination of Federal statutes and programs administered by the Agency relating to

indoor air quality and reduce duplication or inconsistencies among these programs;

(5) work with other Federal agencies to assure the effective coordination of programs related to indoor air quality; and

(6) work with public interest groups and the private sector in development of information related to indoor air quality including the health threats of human exposure to indoor air contaminants, the development of technologies and methods to control such contaminants, and the development of programs to reduce contaminant concentrations.

(c) ORGANIZATION.—The Office of Indoor Air Quality shall—

(A) be directed by a director who shall be a member of the Senior Executive Service;

(B) include a staff of not less than ten permanent, full-time employees; and

(C) be supported by not less than one permanent, full-time employee in each Agency regional office.

COUNCIL ON INDOOR AIR QUALITY

SEC. 11. (a) AUTHORITY.—There is established a Council on Indoor Air Quality.

(b) RESPONSIBILITIES.—THE COUNCIL ON INDOOR AIR QUALITY SHALL—

(1) provide for the full and effective coordination of Federal agency activities relating to indoor air quality;

(2) provide a forum for resolution of conflicts or inconsistencies in policies or programs related to indoor air quality;

(3) review and comment on the national indoor air response program developed pursuant to section 7 of this Act and the Federal Building Response Plan developed pursuant to section 8(b); and

(4) prepare a report to Congress pursuant to subsection (d) of this subsection.

(c) ORGANIZATION.—(1) The Council on Indoor Air Quality shall include senior representatives of Federal agencies involved in indoor air quality programs including—

(A) the Environmental Protection Agency;

(B) the Department of Health and Human Services;

(C) the Department of Labor;

(D) the Department of Housing and Urban Development;

(E) the Department of Energy;

(F) the Department of Transportation;

(G) the Consumer Product Safety Commission; and

(H) the General Services Administration.

(2) The Environmental Protection Agency shall chair the Council.

(3) The Council shall be served by a staff to include an Executive Director and not less than three full-time equivalent employees.

(d) REPORT TO CONGRESS.—(1) The Council shall submit to the Congress, within eighteen months of enactment of this Act, and biennially thereafter, a report which shall—

(A) describe and assess the seriousness, extent, and characteristics of indoor air contamination throughout the country;

(B) summarize the major research issues concerning the protection of indoor air quality, describe the research accomplishments of Federal agencies over the previous two years, and provide an agenda of indoor air quality research for individual Federal agencies over a three-year period;

(C) provide a general description of the activities to be conducted by Federal agencies to address indoor air quality problems over the following three-year period; and

(D) make recommendations for any actions needed to assure the quality of indoor air, including recommen-

dations relating to institutional structures, funding, and legislation.

(2) The Council shall provide for public review and comment on the report required by this subsection.

INDOOR AIR QUALITY INFORMATION CLEARINGHOUSE

SEC. 12. (1) The Administrator is authorized and directed to establish a national indoor air quality clearinghouse to be used to disseminate indoor air quality information to other Federal agencies, State, and local governments, and private organizations and individuals.

(2) The clearinghouse shall be a repository for reliable indoor air quality related information to be collected from and made available to government agencies and private organizations and individuals. At a minimum, the clearinghouse established by this section shall make available reports, programs, and materials developed pursuant to the requirements of this Act.

(3) The clearinghouse shall operate a toll-free "hotline" on indoor air quality which shall be available to provide to the public general information about indoor air quality and general guidance concerning response to indoor air quality contamination problems.

(4) The Administrator may provide for the design, development, and implementation of the clearinghouse through a contractual agreement with a nonprofit organization.

BUILDING ASSESSMENT DEMONSTRATION

SEC. 13. (a) AUTHORITY.—(1) The Director of the National Institute for Occupational Safety and Health shall, in consultation with the Administrator, implement a Building Assessment Demonstration Program to support development of methods, techniques, and protocols for assessment of indoor air contamination in nonresidential, nonindustrial buildings and to provide assistance and guidance to building owners and occupants on measures to reduce indoor air contamination.

(2) In implementation of this section, the Director shall have the authority to conduct on-site assessments of individual buildings, including Federal, State, and municipal buildings.

(3) Nothing in this section shall in any way limit or constrain existing authorities pursuant to the Occupational Safety and Health Act of 1970 (29 U.S.C. 651).

(b) ASSESSMENT ELEMENTS.—Assessments of individual buildings conducted pursuant to this section shall, at a minimum, provide—

(A) an identification of suspected contaminants in the air in the building and the level of such contaminants;

(B) an assessment of the probable sources of contaminants in the air in the building;

(C) a review of the nature and extent of health concerns and symptoms identified by building occupants;

(D) an assessment of the probable association of indoor air contaminants with the health and related concerns of building occupants including assessment of occupational and environmental factors which may relate to the health concerns;

(E) identification of appropriate measures to control contaminants in the air in the building, to reduce the concentration levels of contaminants, and to reduce exposure to contaminants; and

(F) evaluation of the effectiveness of response measures in control and reduction of contaminants and contaminant levels, the change in occupant health concerns and symptoms, the approximate costs of such measures, and any additional response measures which may reduce occupant's health concerns.

(c) ASSESSMENT REPORTS.—(1) The Director shall prepare—

(A) a preliminary report of each building assessment which shall document findings concerning assessment elements (A) through (E) of subsection (b); and

(B) a final report which shall provide an overall summary of the building assessment including informa-

tion on the effectiveness and cost of response measures, and the potential for application of response measures to other buildings.

(2) Preliminary assessment reports shall be prepared not later than one hundred and eighty days after the selection of a building for assessment. Final assessment reports shall be prepared not later than one hundred and eighty days after completion of the preliminary report.

(3) Preliminary and final reports shall be made available to building owners, occupants, and the authorized representatives of occupants.

(d) BUILDING ASSESSMENT PROPOSAL.—(1) The Director shall consider individual buildings for assessment under this section in response to a proposal identifying the building and the building owner and providing preliminary, background information about the nature of the indoor air contamination, previous responses to air contamination problems, and the characteristics, occupancy, and uses of the building.

(2) Building assessment proposals may be submitted by a building owner or occupants or the authorized representatives of building occupants, including the authorized representatives of employees working in a building.

(e) BUILDING ASSESSMENT SELECTION.—(1) In selection of buildings to be assessed under this section, the Director shall consider—

(A) the seriousness and extent of apparent indoor air contamination and human health effects of such contamination;

(B) the proposal for a building assessment submitted pursuant to subsection (d) of this section;

(C) the views and comments of the building owners;

(D) the potential for the building assessment to expand knowledge of building assessment methods including identification of contaminants, assessment of sources, and development of response measures; and

(E) the listing of a building pursuant to paragraph (C) of section 8(b)(3).

(2) The Director shall provide a preliminary response and review of building assessment proposals to applicants and the applicable building owner within sixty days of receipt of a proposal and, to the extent practicable, shall provide a final decision concerning selection of a proposal within one hundred and twenty days of submittal.

(f) BUILDING ASSESSMENT SUPPORT.—(1) The Director may enter into agreements with private individuals, firms, State and local governments, or academic institutions for

services and related assistance in conduct of assessments under the authority of this section.

(2) The Director may enter into agreements with other Federal agencies for the assignment of Federal employees to a specific building assessment project for periods of up to one hundred and eighty days.

(g) SUMMARY REPORT.—(1) The Director shall provide, on an annual basis, a report on the implementation of this section to the Administrator of the Environmental Protection Agency and to the Council on Indoor Air Quality established pursuant to section 11 of this Act.

(2) The Director shall, from time to time and in consultation with the Administrator, publish general reports containing materials, information, and general conclusions concerning assessments conducted pursuant to this section. Such reports may address concerns related to remediation of indoor air contamination problems, assessment of health related concerns, and prevention of such problems through improved design, materials and product specifications, and management practices.

(3) Reports prepared pursuant to this subsection and subsection (c) of this section shall be provided to the Indoor Air Quality Information Clearinghouse provided for in section 12 of this Act and, to the extent practicable, such reports

shall be made available to architectural, design and engineering firms and to organizations representing such firms.

STATE AND FEDERAL AUTHORITY

SEC. 14. Nothing in this Act shall be construed, interpreted, or applied to preempt, displace, or supplant any other State or Federal law, whether statutory or common or any local ordinance.

AUTHORIZATIONS

SEC. 15. (a)(1) For the purpose of carrying out sections 5 and 6 of this Act there is authorized to be appropriated $20,000,000 for each of the fiscal years ending September 30, 1990, 1991, 1992, 1993, and 1994. Of such sums appropriated, one quarter shall be reserved for implementation of section 6 of this Act and one quarter shall be reserved for implementation of section 5(c) of this Act.

(2) For the purpose of carrying out sections 7, 8, 10, and 12 there is authorized to be appropriated $10,000,000 for each of the fiscal years ending September 30, 1990, 1991, 1992, 1993, and 1994. Of such sums appropriated, one-fifth shall be reserved for implementation of section 12 and one-fifth shall be reserved for implementation of section 8.

(3) For the purpose of carrying out section 9 of this Act, there is authorized to be appropriated $12,000,000 for each of the fiscal years ending September 30, 1990, 1991, 1992, 1993, and 1994. Of such sums appropriated, one-third shall

be reserved for the purpose of carrying out section 9(b) of this Act.

(4) For the purpose of carrying out section 11 of the Act there is authorized to be appropriated $1,500,000 for each fiscal year ending September 30, 1990, 1991, 1992, 1993, and 1994.

(5) For the purpose of carrying out section 13 of this Act there is authorized to be appropriated $5,000,000 per year for each fiscal year ending September 30, 1990, 1991, 1992, 1993, and 1994.

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